VERNON ENVIRONMENTAL, INC.

3949 Klahanie Drive SE, #9202, Issaquah, Washington *P/C/F 206.686.2469*

Catch Basin Sediment Field Sampling Results Report (Split Sampling Between Rainier Commons, Seattle Public Utility and King County)

Former Rainier Brewery Property
3100 Airport Way South
Seattle, Washington
King County

Prepared for:

Rainier Commons, LLC
c/o Ariel Development, LLC
Eitan Alon
3100 Airport Way South
Seattle, WA 98134

Prepared by:

Vernon Environmental, Inc.
3849 Klahanie Drive SE, Suite 9202
Issaquah, Washington 98029

July 14, 2008

Catch Basin Sediment Field Sampling Results Report
(Split Sampling Between Rainier commons, Seattle Public Utility and King County)

Former Rainier Brewery Property

1.0 Site Background

The former Rainier Brewery property is an approximate 4.57-acre parcel located at 3100, Airport Way South, Seattle, WA (the, "Site"). The Site is bound between South Stevens Street to the north, by South Horton Street to the south, by Interstate-5 to the east and Airport Way South to the west. Rainier Commons, LLC (the, "Rainier") owns the Site, which is operated by Ariel Development, Inc. (the, "Ariel"). One-third of the Site is leased to Tully's Coffee. Tully's roasts, grinds, packages, distributes coffee and operates its corporate headquarters on the premises.

The Site was initially developed in the late 1800s as a brewery and functioned in a similar capacity until 1996. The Site has been owned by several entities since its initial development. Separate phases of Site redevelopment has occurred throughout its history. The Site is currently being redeveloped into community mixed use, including but not limited to, residential, commercial and retail space.

Farallon Consulting, Inc. (the, "Farallon") conducted a Phase I Environmental Site Assessment on April 14, 2004. Farallon reported, from their Site reconnaissance, nine (9) pad-mounted electrical transformers at various locations throughout the Site. Farallon also observed oil staining at floor drains adjacent to transformer vaults within several of the buildings and adjacent to abandoned equipment. They did not identify the transformer locations and associated vaults or drains as a Recognized Environmental Condition. Ariel states all of the existing onsite transformers are non-PCB containing.

On October 12, 2005 the City of Seattle's Public Utilities Department (the, "SPU") conducted a stormwater pollution prevention inspection at the Former Rainier Brewery property. Preliminary analytical data from the sediment sampling event at the Site showed concentrations of PCBs (up to 2,200 mg/kg) in the sediment collected from the following locations: the breezeway trench drain, the catch basins in the tank farm area, and two catch basins in the southwest parking lot adjacent to the building and north of the loading dock. Due to the elevated concentrations of PCBs in the sediments, the SPU directed Ariel to employ a consultant/contractor to assist in proper disposal of the material according to appropriate state and federal regulations. They also, directed Ariel to clean all outdoor inlets/trench drains/catch basins/pipes on its property. The SPU recommended additional sampling and analysis of the materials in subject structures to ensure adequate disposal methods are employed. Ariel received the SPU's Corrective Action Letter dated November 22, 2005 directing Ariel to cleanup the affected Site sediments within 30-days.

Ariel received another SPU letter dated January 6, 2006 regarding "Follow-up to Site Meeting on December 12, 2005" which included an extension of their original request to have Ariel cleanup the Site within 30-days. Ariel formally notified the Washington State Department of Ecology (Ecology) about the presence of PCB concentrations in their catch basin sediments during a meeting between Ecology (Dan Cargill) and Ariel (Eitan Alon and its consultant Conrad Vernon of VEI) on January 24, 2006. Ariel agreed to meet the following SPU required compliance contingencies:

- Meeting the content of the SPU's corrective action letter dated November 22, 2005,
- Hiring a consultant that is experienced in PCB remediation and disposal,
- Jet-cleaning of all lines connecting catch basins (with PCBs in the sediments) to remove any residual contaminated sediment in the lines,
- Notifying the Department of Ecology of the finding of significant concentrations of PCBs at your site as required by law,
- Keeping SPU apprised of ongoing work at the site in a timely manner,
- Showing continuing forward progress with the cleanup, and
- Meeting with SPU on a quarterly basis to re-evaluate the situation. Quarterly meetings commencing in early March 2006.

During Ariel's January 24, 2006 meeting with Ecology, the SPU's catch basin sediment sampling results and Ecology's regulatory approach for the ultimate cleanup of the Site sediments were discussed and agreed. The following items (in order of priority) were identified:

- Provide Methodology Plan for identifying underground subject pipes,
- Identify underground subject pipes with a dye study or other equivalent means to Ecology's satisfaction,
- Provide an as-built drawing of subject underground pipes including inlet points, catch basins, manholes, etc.
- Provide Field work Plans, i.e., Field Sampling Plan, Data Quality Objectives Plan, Quality Assurance/Quality Control (QA/QC) Plan and Health & Safety Plan,
- Collect manhole and catch basin sediment samples, analyze samples, report analytical results,
- Provide a Remedial Action Plan to cleanup the Site sediments in pipes and collection points (i.e., cleanup the catch basin and manhole sediments, as well as jet clean the pipes), and
- Implement the Remedial Action Plan.

Ariel has located and identified subject underground pipes on the Site and has provided an as-built drawing presenting the aforementioned utilities. The Ecology and SPU reviewed and accepted Field Work Plans, i.e., Sampling Plan, Data Quality Objective Plan, and Quality Assurance/Quality Control Plan were used to complying with the overseeing regulatory authorities requirements.

October 12, 2005 SPU Sediment Analytical Results:

SPU sampled six (6) sediment sample points on October 12, 2005 for the presence of PCBs at locations discussed above. The analytical results from each location are BNSF CB1-17 mg/kg, BNSF CB2-23 mg/kg, CB 14-175 mg/kg, CB 8-1,340 mg/kg, composite of CB1 through CB6-19.8 mg/kg and CB12-2,200 mg/kg .

On October 4, 2007 KC's Bruce Tiffany and Arnaud Girard, SPU's Beth Schmoyer, VEI's Conrad Vernon, and Rainier Common's Eitan Alon and John Jack met to discuss potential catch basin sediment containing polychlorinated biphenyl (the, "PCB) that may potentially be discharged from the Site to the Duwamish waterway and wastewater treatment facility located at the Magnolia, Washington treatment facility via KC and SPU storm drains and combined sewer overflows.

June 2006 VEI Sediment Analytical Results:

VEI compared past SPU PCB analytical results from SPU's October 12, 2005 stormwater pollution prevention catch basin inspection and VEI's Catch Basin analytical results collected in June 2006 at the Site. VEI showed the concentrations of PCB analytical results, found in the Site catch basin sediments, had decreased from SPU's highest sample concentration of 2,200 mg/kg located in catch basin CB 12 to VEI's CB 12 sediment PCB sample result concentration of non-detect ((at a Method Reporting Limit of 0.20 mg/kg) by Advanced Analytical Laboratory located in Redmond, WA. SPU and VEI catch basin analytical result trends are presented below.

SPU October 2005 Rainier Commons Catch Basin Sediment Analytical Results (PCB A1254)	**VEI June 2006 Rainier Commons Catch Basin Sediment Analytical Results (PCB A1254)**
BNSF CB-1: 17 mg/kg	BNSF CB-1: 4.3 mg/kg
BNSF CB-2: 23 mg/kg	BNSF CB-2: Non-Detect (ND)
CB-14: 175 mg/kg	CB-14: 0.51 mg/kg
CB-8: 1,340 mg/kg	CB-8: 3.2 mg/kg
CB-1 through CB-6 (composite): 19.8 mg/kg	CB-1: 0.54 mg/kg; CB-2 through CB-6: ND
CB-12: 2,200 mg/kg	CB-12: ND

In an effort to determine whether the PCB source was a result of paint chips released from the facility during painting operations, VEI also collected a paint chip sample. The sample analytical result showed the paint contains 2,300 mg/kg PCB A1254. Based on the paint sample analytical result compared to SPU's catch basin sediment highest PCB analytical result of 2,200 mg/kg, it is highly feasible the paint chips are the source of catch basin sediment impact that may be a result of paint chips migrating from paint chip removal activities to the catch basins during surface run-off precipitation events. Remaining PCB paint on the exterior of the building has been encapsulated through the application of new paint. Moreover, Rainier Commons implemented its PCB Paint O&M Plan in its effort to prevent any future release.

It is Rainier Common's position that the paint chips are no longer present above regulatory concentration limits in the Site catch basin sediments as the analytical trends show over time. SPU and KC identified immediately adjacent and hydraulically down gradient catch basin sample locations to the Site. VEI prepared Catch Basin Sediment Field Sampling, Data Quality Objective and QA/QC Work Plans (Split Sampling Between Rainier Commons, Seattle Public Utility and King County) in response to SPU and KC identified sampling locations dated January 3, 2008. The following results present the analytical results from three (3) King County sampling events and one (1) Seattle Public Utility sampling event.

Chemical(s)-of-concern (PCBs) were compared to Ecology's MTCA Method A cleanup levels of 1.0 mg/kg in a soil matrix. Guidance promulgated under federal statutes 40 CFR 761 is also referenced.

The Field Sampling Plan was prepared for on-site sampling activities. The plan included:

- Sampling objectives
- Sample location and frequency
- Sample Designation
- Sampling equipment and procedures
- Sample handling and analysis

2.0 Sampling Objectives

The sampling objectives, for this sampling event, were to identify on-site PCBs and their respective concentrations in sediments at catch basin locations determined by SPU and in storm water effluent by KC. Analytical results will be used to determine future sediment and stormwater collection and analysis, as well as, remediation points for cleanup compliance.

Another objective was to address and demonstrate data identification; decision inputs, decision rule development, decision error limits and design optimization.

3.0 Sample Location and Frequency

On January 9, 2008 SPU and VEI conducted a one (1)-time catch basin split sampling event immediately prior to SPU water jetting and vactoring the catch basin/associated pipe sample locations. Figure 1 shows the sediment grab/composite sample locations (these are numbered catch basins). SPU identified four (4) hydraulically down gradient, immediately adjacent catch basin sample locations (one (1) more than originally scoped). The January 3, 2008 VEI Field Sampling Plan identified proposed SPU catch basin

sample locations. SPU made a field decision to sample catch basins running parallel to Airport Way between and immediately bordering Tully's retail store parking area and the Rainier Commons Buildings. The first catch basin (CB-1) is located nearest Stevens Street with CB-2, CB-3 and CB-4 running in a straight line south along the pipe conveyance. SPU and VEI also collected one (1) additional vactor truck split sediment sample.

On January 10th, March 13th and June 4th 2008 KC and VEI conducted three (3) end-of-pipe storm water effluent sampling events located at Manhole-1 (Figure 1). The KC storm water effluent sampling events are an addition to the January 3, 2008 VEI prepared Catch Basin Sediment Field Sampling, Data Quality Objective and QA/QC Work Plans (Split Sampling Between Rainier Commons, Seattle Public Utility and King County). KC provided notice of the first sampling event one-day before they mobilized. This did not provide adequate time to incorporate the KC sampling events into the Work Plans. The methods and results follow prescribed regulatory guidance and are provided within this report.

The catch basins and trench drains collect surface drainage and convey it to the storm drain lines (pipes). Selection of these locations assumes the sediment grab/composite sample locations cover the impacted area(s) of the underground stormwater utilities and the samples are at sample locations hydraulically down-gradient in the drainage system and will therefore, be representative of Site underground utility conditions.

Sediment samples were collected and analyzed from each catch basin location during this sampling event as a matrix of five (5)-point grab/composite sediment samples (Section 5). Stormwater effluent samples were collected from a single hydraulically down gradient end-of-pipe point source prior to discharge into an off-site KC stormwater conveyance.

4.0 Sample Designation

Collected sediment and stormwater effluent samples were designated as shown in Table 1. Sampling guidelines are provided in Table 2. The sampling point locations include a center point and the four (4) corners of each catch basin. Sediment samples were collected for one chemical-of-concern, i.e., PCBs at each sample location. Stormwater effluent samples were collected over an eight (8)-hour period using an ISCO sampler. Stormwater sample aliquots were collected every 15-minutes. The stormwater composite was split for laboratory analysis between KC and VEI.

One (1) duplicate from one (1) catch basin was collected for quality control purposes.

5.0 Sample Equipment, Procedures and Handling

Vernon Environmental, Inc. (VEI) collected split sediment grab/composite samples at the identified catch basin locations (Figure 1) during the single sampling event. Split composite stormwater samples were collected during three (3) sampling events.

EPA prescribed method protocols regarding sample collection, cross contamination prevention, sample preservation, sample container type, sample holding temperature, and holding times were followed (January 3, 2008 Work Plans).

Sediment Sample Collection

SPU's field technician collected the split samples. VEI's Conrad Vernon observed the sample collection. Gloves were worn at all times while collecting sediment samples. Descriptions of field observations (including oil sheens and potential contributing activities) and sample characteristics (odor, amount and type of particles being removed, size description, color) were included in SPU field notes recorded during sample collection. SPU collected background vactor truck samples prior to vactoring the catch basins and pipe conveyances.

Catch Basin Sediment

Catch-basin sediment samples were collected using stainless steel spoons and long-handled scoops or soil coring devices. Samples were collected from the top 3-4 inches of sediment accumulated in the catch basin. Individual aliquots were collected from five locations in the sump/structure (four (4) corners and one (1) center point), placed in a stainless steel bowl, and thoroughly mixed. Any particles greater than 2 centimeter in size were removed from the sample and discarded. After mixing, split 250gram aliquot samples were removed and placed into pre-cleaned sample containers provided by the analytical laboratory. Samples were placed in a cooler and stored on ice until delivered to each respective analytical laboratory.

Equipment Decontamination

All sampling equipment including stainless-steel materials was decontaminated prior to each sampling event. The following decontamination procedures were followed after every sampling event:

Stainless-Steel Scoop and Mixing Bowl

- Phosphate-free detergent wash and tap water rinse
- Reagent-grade water rinse
- Ultra-pure methanol rinse
- Air dry
- Wrapped in new aluminum foil and bagged in plastic.

After the decontamination procedures were completed, the sampling equipment was capped or sealed with new aluminum foil and the sampling device was protected and kept clean.

Each sample was clearly marked with the date and time of sample collection, sample collection technician's name, unique sample identification, preservative used and analysis to be performed. Each sample was sealed with chain-of-custody tape. Each sample cooler contained blue ice (or equivalent) to keep the temperature below 40 degrees

Fahrenheit. Each sample cooler was chain-of-custody sealed and a chain-of-custody form was completed in triplicate and placed in the cooler prior to sealing and shipment.

Stormwater Effluent Sample Collection

KC's field Technician collected the split samples. VEI's Conrad Vernon observed the sample collection. Gloves were worn at all times while collecting stormwater samples. Descriptions of field observations (including oil sheens and potential contributing activities) and sample characteristics (odor, amount and type of particles being removed, size description, color) were included in KC field notes recorded during sample collection.

Manhole Stormwater Effluent

End-of-pipe composite stormwater samples were collected using an ISCO sampler. Samples were collected from the bottom of the manhole catch basin where the stormwater pipe discharged. Individual stormwater aliquots were collected in 15-minute intervals through pre-DI water cleaned Tygon tubing that discharged into the pre-cleaned ISCO sampler container over an eight (8) hour period. After collection, the stormwater was poured into a pre-DI water cleaned carboy and mixed with a swirling motion. After mixing, split samples were removed and placed into pre-cleaned 1000 ml amber sample containers provided by the analytical laboratory. Samples were placed in a cooler and stored on ice until delivered to each respective analytical laboratory. KC collected a field blank from the equipment and tubing prior to use. EPA prescribed equipment decontamination procedures were followed.

6.0 Catch Basin Sediment Sample and Stormwater Analytical Laboratory Results

Collected catch basin sediment and stormwater sample analytical results are presented in Appendix A. Sediment and stormwater results are compared to the Washington State Department of Ecology's Model Toxic Control Act (MTCA) Method A Cleanup Standards. Results by analyte are presented below.

Summary of Catch Basin Sediment Analytical Results
Former Rainier Brewery Property
Seattle, Washington

	PCB A1254
Tul CB-1	5.3 mg/kg
Tul CB-2	1.0 mg/kg
Tul CB-3	34 mg/kg

Tul CB-4	8.6 mg/kg
Tul VAC-1	<0.1 mg/kg

Three (3) sediment sample results are reported above MTCA Method A standards (1.0 mg/kg for Aroclor 1254).

Summary of Man Hole Stormwater Analytical Results
Former Rainier Brewery Property
Seattle, Washington

Man Hole-1	PCB Total	TOC	TSS	Duplicate
1/10/08	<0.1 mg/kg			
3/13/08	<0.1 mg/kg			
6/3/08	<0.1 mg/kg	18.4 mg/L	45.9 mg/L	
6/3/08				<0.1 mg/kg

7.0 Data Quality Objective Results

The data quality objectives developed for this Site was appropriate. Please reference the Data Quality Objective Plan (the, "DQOs"), dated January 3, 2008 prepared by Vernon Environmental, Inc. The DQOs were developed in an effort to ensure decisions regarding the design of the investigation and its resultant data would reasonably encompass suspected chemical(s)-of-concern collection and analyses as promulgated under the Washington State Department of Ecology's Model Toxic Control Act. Furthermore, the DQOs would also provide confidence in identifying the aerial and vertical extent of suspected contamination in the sampled catch basin sediments and stormwater effluent at the Site.

The DQOs were developed under the following seven (7) categories:

- Site Impact Summary,
- Decision Identification,
- Decision Inputs,
- Site Boundaries,
- Decision Rule Development,

- Decision Error Limits, and

- Design Optimization

Analyzes of existing and new data to select the lowest cost sampling design that was expected to meet the DQOs was implemented. Existing data from previous investigations was useful in determining contaminant classes and expected concentrations. New data was generated to determine compound class concentrations and media contamination. A tolerance interval of 95% was used to make this determination.

Based on the analytical results, the compound classes identified is appropriate, including the above seven (7) developed data quality objective criteria.

8.0 Data Quality Assurance/Quality Control (QA/QC) Results

All data fell within established and acceptable QA/QC controls. Please reference the QA/QC Plan dated January 3, 2008 prepared by Vernon Environmental, Inc. The purpose of the QA/QC Plan was to relate project objectives to specific measurements required to achieve those objectives. The QA/QC Plan provided sufficient detail to demonstrate the following:

- Intended measurements were appropriate for achieving project objectives

- Quality control procedures were sufficient for obtaining data of known and adequate quality

- Such data is defensible if challenged technically or legally

The QA/QC Plan supported the analytical results, which may be used to evaluate and select basic options required to evaluate the identified areas on the site. The Field Sampling Plan contains many of the elements that are required in the QA/QC Plan (Field Sampling Plan, Vernon Environmental, Inc., January 3, 2008). Please reference the Sampling Plan for the following QA/QC elements.

- The site background and environmental overview

- Statement of project objectives

- Sample collection design for critical and non-critical measurements

- Tabular summary for type and number of samples, sampling points, quality control and reserve sample collection and analysis

- Tabular summary of conventional chemistry parameters

- Sample collection schedule
- Applicable regulations
- Sampling site location, procedures, frequency, affected media and validity
- Analytical laboratory methods, e.g., EPA Standard Methods
- Quality control checks
- Required containers, holding times and preservation techniques

Quantitative objectives included analytical result precision, accuracy, method detection limits and completeness. All data fell within acceptable QA/QC parameters.

Qualitative quality assurance objectives included data set comparability and representativeness. Comparability was achieved by using consistent sample collection and analytical methods. SPU, KC and Vernon Environmental were a reliable source for field related sample collection activities. The analytical laboratory was a reliable source for analytical method protocols. Representativeness was achieved by collecting an adequate number of unbiased samples. The data quality objectives attached to the sampling plan assisted in making this determination.

Completeness was also part of the QA/QC plan. A ninety (90) percent goal was established (90% of the total number of samples collected and analyzed have results that passed data validation). The goal was met. Changes were made to the Work Plan; SPU changed the sample locations and KC sampling events were added to the field activities. VEI used Friedman & Bruya, Inc. analytical laboratory in lieu of North Creek Analytical.

Proper sample custody ensuring the analytical results were not compromised during transportation and storage was accomplished. Records of everyone involved with handling the samples were maintained showing sample history for reconstruction later, should the need arise. Please reference the Sampling Plan regarding how sample custody was maintained and recorded from the field to the laboratory. Typical chain-of-custody reports, sample container labels, and custody seals were used. Appendix A presents the chain-of-custody forms.

Friedman & Bruya was responsible for in-house chain-of-custody. Sample tracking was recorded throughout laboratory locations for unpacking, extracting, and analysis. A paper trail was provided to document intra laboratory chain-of-custody.

The schematic flow chart, in the QA/QC Plan, showing the process for data handling, collection, transfer, storage, recovery and review for field and laboratory operations was followed.

Michael Erdahl and Conrad Vernon were responsible for data reduction. EPA and ASTM Standard Methods for data reduction procedures were followed. Analytical results were compared to QA/QC parameters for each analyzed chemical. Blanks were included in determining analyte concentration. No blank samples were above method detection limits. All sediment data was reported on a dry weight basis.

The data validator reviewed all analytical results and compared them to established QA/QC controls. The analytical results do not contain flagged data outliers.

9.0 Conclusions and Recommendations

The sediment analytical results show polychlorinated biphenyls (PCBs) have been released to sediments, contained in 3 of the 4 catch basin sampling points, above applicable regulatory cleanup standards. PCB analytical results range from ND to 34 mg/kg above the cleanup standard of 1.0 mg/kg (Section 6.0). The stormwater analytical results show stormwater has not been impacted above regulatory limits.

In view of the analytical results from the catch basin sediment/stormwater investigation, VEI recommends development of a catch basin Operation & Maintenance Plan for use in controlling the release of potential sediment containing PCBs from the catch basins (quarterly clean out of the catch basins). VEI also recommends discussion of the catch basin results with Ecology, KC and SPU in an effort to determine next steps.

10.0 Limitations

The conclusions contained in this report are based on professional opinions with regard to the subject matter and are limited by the limited available information provided by Ariel Development, Inc. with regard to the Site; access restrictions during the Site investigation/inspection due to the current business operations; and client imposed time restrictions to complete historical research and the investigation. These opinions have been offered in accordance with currently acceptable standards and practices applicable to this Site and imposed project restrictions. The following presents inherent limitations:

- **Accuracy of Information.** Certain information used by Vernon Environmental, Inc. (the, "VEI") to complete this report has been obtained, reviewed, and evaluated from various sources believed to be reliable. Although VEI's conclusions and opinions are based in part on such information, VEI's services did not include the verification of its accuracy or authenticity. Should such information prove to be inaccurate or unreliable, VEI reserves the right to amend or revise its conclusions, opinions, and recommendations.

- **Limitations.** Because VEI's report is based on information, the accuracy of which has not been determined, and because VEI's observations made during the Site investigation are limited, VEI cannot and does not guarantee that latent or undiscovered conditions will not become evident in the future. Since Site activities beyond our control could change at any time after the completion of this

report, our observations, findings, and opinions can be considered valid only as of the date of the completion of the investigation. Unless stated otherwise herein, this information is intended for and restricted to the sole use of Ariel Development, Inc. any use, interpretation, or reliance upon this information by anyone other then the parties identified, is at the sole risk of that party, and VEI shall have no liability for such unauthorized use, interpretation, or reliance. VEI's professional services agreement, executed with its client, present the sole remedy, including but not limited to, limitations of liability between VEI and its client.

Appendix A

Analytical Results

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

January 23, 2008

Conrad Vernon, Project Manager
Vernon Environmental, Inc.
3524 255th Ln SE #3
Issaquah, WA 98027

Dear Mr. Vernon:

Included are the results from the testing of material submitted on January 9, 2008 from the Rainier Commons Sediment in Catchbasins, F&BI 801076 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
NAA0123R.DOC

801076 conrad.vernon@amec.com

SAMPLE CHAIN OF CUSTODY ME 01/09/08 A03

Page # _____ of _____

Send Report To Conrad Vernon
VET Company Vernon Environmental, Inc
Address 3524-255th Ln SE, #3
City, State, ZIP Issaquah, WA 98027
Phone # 206.686.2469 Fax # _____

SAMPLERS (signature)
PROJECT NAME/NO. Rainier Commons Sediment in Catchbasins
PO #
REMARKS

TURNAROUND TIME
☐ Standard (2 Weeks)
☐ RUSH _____
Rush charges authorized by: _____

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	PCB soon						Notes
TvlCB1	01	1/9/08	10:15 Am	Sediment	1							X						normal Turnaro
TvlCB2	02		10:45		1							X						
TvlCB3	03		10:55		1							X						
TvlCB4	04		11:15		1							X						
TvlVAC1	05		1:15 Pm		1							X						

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Conrad F. Vernon	VET	1/9/08	2:10 Pm
Received by:		Nhan Phan	FEBI	1/9/08	2:10
Relinquished by:					
Received by:					

Samples received at 10 °C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on January 9, 2008 by Friedman & Bruya, Inc. from the Vernon Environmental, Inc. Rainier Commons Sediment in Catchbasins, F&BI 801076 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Vernon Environmental, Inc.
801076-01	TUL CB1
801076-02	TUL CB2
801076-03	TUL CB3
801076-04	TUL CB4
801076-05	TUL VAC1

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/23/08
Date Received: 01/09/08
Project: Rainier Commons Sediment in Catchbasins, F&BI 801076
Date Extracted: 01/16/08
Date Analyzed: 01/18/08

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PCBs
USING EPA METHOD 8082

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Total PCBs	Surrogate (% Recovery) (Limit 50-150)
TUL CB1 d 801076-01	5.3	140
TUL CB2 801076-02	1.0	139
TUL CB3 d 801076-03	34	50
TUL CB4 d 801076-04	8.6	124
TUL VAC1 d 801076-05	37	ip
Method Blank	<0.1	71

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/23/08
Date Received: 01/09/08
Project: Rainier Commons Sediment in Catchbasins, F&BI 801076

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS TOTAL PCBs BY EPA METHOD 8082

Laboratory Code: 801094-02 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Total PCBs	mg/kg (ppm)	<0.1	<0.1	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	% Recovery LCS	% Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Total PCBs	mg/kg (ppm)	1.7	85	90	73-135	6

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probablility.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

January 23, 2008

Conrad Vernon, Project Manager
Vernon Environmental, Inc.
3524 255th Ln SE #3
Issaquah, WA 98027

Dear Mr. Vernon:

Included are the results from the testing of material submitted on January 10, 2008 from the Rainier Commons, F&BI 801099 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
NAA0123R.DOC

CHAIN OF CUSTODY RECORD

Mail Data/Invoices to:

Project Number: _____
Purchase Order Number: _____
Subcontract Laboratory: _____
LPM/TC: _____

Shipment Number: _____
Shipment Method: _____
Fax data to: _____
Fax Number: _____
e-mail: _____

Sample ID	Collect Date	Matrix	QC Required	Requested Parameters: PCB Total											No. of Containers	Comments
Rainier Commons	1/10/08	sewer WTR		X											3	(3 1 Liter Ambers)

Additional Comments/Instructions:

Total Number of Containers: 0

Requested TAT: _____
Data Package Due: _____

Please return signed <u>original</u> CoC with data package.

RELINQUISHED BY		RECEIVED BY	
Signature	Dana Heine	Signature	Conrad Vernon
Printed Name	DANA HEINE	Printed Name	Conrad Vernon
Organization	King County Industrial Waste	Organization	VEC
Date	1/10/08	Date	1/10/08
Time	1545	Time	

801099

SAMPLE CHAIN OF CUSTODY

ME 01-10-08 A04

Send Report To: Conrad.Vernon@Amec.com
Company: VET
Address: 3525 255th Ln SE, #3
City, State, ZIP: Iss., WA 98029
Phone #: 206.686.2469 Fax #: SAME

SAMPLERS (signature)

PROJECT NAME/NO. | PO #

REMARKS

Page # _____ of _____

TURNAROUND TIME
- ☐ Standard (2 Weeks)
- ☐ RUSH _____
- Rush charges authorized by: _____

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	PCB 8082						Notes
Manhole 1	1	1/10/08	9-14:30	water	3							X						Total PCB

ANALYSES REQUESTED

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Conrad F. Vernon	VET	1/10/08	16:35
Received by:		Nhan Phan	FEBI	01/10/08	16:35
Relinquished by:					
Received by:		Samples received at 3 °C			

FOR: OCN: DOC:

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on January 10, 2008 by Friedman & Bruya, Inc. from the Vernon Environmental, Inc. Rainier Commons, F&BI 801099 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Vernon Environmental, Inc.
801099-01	Man Hole 1

The 8082 relative percent difference of the laboratory control sample and duplicate exceeded the acceptance criteria. The sample was non detect, therefore the data is acceptable.

All other quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/23/08
Date Received: 01/10/08
Project: Rainier Commons, F&BI 801099
Date Extracted: 01/15/08
Date Analyzed: 01/17/08

RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PCBs
USING EPA METHOD 8082
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Total PCBs	Surrogate (% Recovery) (Limit 50-150)
Man Hole 1 801099-01	<0.1	93
Method Blank	<0.1	51

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/23/08
Date Received: 01/10/08
Project: Rainier Commons, F&BI 801099

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PCBS AS AROCLOR 1016/1260 BY EPA METHOD 8082

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	% Recovery LCS	% Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Total PCBs	ug/L (ppb)	5	72	89	52-135	21 vo

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probablility.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

March 26, 2008

Conrad Vernon, Project Manager
Vernon Environmental, Inc.
3524 255th Ln SE #3
Issaquah, WA 98027

Dear Mr. Vernon:

Included are the results from the testing of material submitted on March 13, 2008 from the 42-3368, F&BI 803134 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
NAA0326R.DOC

~~803144~~ 803134 ME 03-13-08 A05 VEI

CHAIN OF CUSTODY RECORD

206.686.2469
CONRAD.VERNON@VERNONENVIRO METAL.COM

Project Number: 42-3368
Purchase Order Number:
Subcontract Laboratory: FB
LPM/TC:

Shipment Number:
Shipment Method:
Fax data to:
Fax Number:
e-mail:

Mail Data/Invoices to:
King County WPCD Environmental Laboratory
Subcontract Analysis Coordinator
322 W. Ewing Street, LAB-NR-0100
Seattle, WA 98119

Lab ID	Sample ID	Collect Date	Matrix	QC Required	Requested Parameters: PCBLL TOTAL	No. of Containers	Comments
-01	45098-1	3-13-08	~~Water~~ Storm-water	ND	X		Started ISCO @ 10:00, 4L5
-02	Duplicate 45098-2	3-13-08	Stormwater	ND	X		4 hour, 17 samples 75ml, 4L5

Additional Comments/Instructions:

Total Number of Containers: 0

Please return signed original CoC with data package.

Requested TAT:
Data Package Due:

RELINQUISHED BY		Date	RECEIVED BY		Date
Signature	Tammy Hines	3/13/08	Signature		3/13/08
Printed Name	Tammy Hines	Time 14:35	Printed Name	Conrad Vernon	Time 14:35
Organization	King County Industrial Waste		Organization	VEI	

Dave FBI 3/13-08 @ 3PM

Samples received at 4 °C

King County DNR Environmental Laboratory 322 West Ewing St MS-LAB-NR-0100 Seattle 98119 (206) 684-[illegible] PINK

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on March 13, 2008 by Friedman & Bruya, Inc. from the Vernon Environmental, Inc. 42-3368, F&BI 803134 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Vernon Environmental, Inc.
803134-01	45098-1
803134-02	Duplicate 45098-2

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/26/08
Date Received: 03/13/08
Project: 42-3368, F&BI 803134
Date Extracted: 03/19/08
Date Analyzed: 03/20/08

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PCBs USING EPA METHOD 8082

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Total PCBs	Surrogate (% Recovery) (Limit 50-150)
45098-1 803134-01	<0.1	86
Duplicate 45098-2 803134-02	<0.1	103
Method Blank	<0.1	68

Date of Report: 03/26/08
Date Received: 03/13/08
Project: 42-3368, F&BI 803134

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR POLYCHLORINATED BIPHENYLS AS TOTAL PCBs BY EPA METHOD 8082

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	% Recovery LCS	% Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Total PCBs	ug/L (ppb)	4.0	90	99	73-135	10

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probablility.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

June 20, 2008

Conrad Vernon, Project Manager
Vernon Environmental, Inc.
3524 255th Ln SE No. 3
Issaquah, WA 98029

Dear Mr. Vernon:

Included are the results from the testing of material submitted on June 4, 2008 from the Rainier Commons, F&BI 806054 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
NAA0620R.DOC

METRO ENVIRONMENTAL LABORATORY 322 W. Ewing Street Seattle, WA 98119-1507 (206) 684-2300 FAX: (206) 684-2310

806054

LABORATORY WORK ORDER ME 06-04-08 C04 / V1 / AIG

Organization: Industrian Waste
Address: 130 Nickerson St. #200
Seattle, WA 98109
Phone: 263-3000 Fax: 263-3001
Project Name: Rainier Commons
Project Number:

Client Sample ID	Date Sampled	Time	Matrix	Metro LIMS No.	PCB (2 Liters)	TOC (2 VOA vials)	TSS (1 Liter)	Lab ID	NO. OF CONTAINERS
A00709	6/3/08	0815	waste water		X	X	X	01 thru 5	5

Send results to
Conrad.vernon@vernonEnvironmental.com
3524 255th Ln SE #3
Issaquah, WA 98029

Requested Parameters

COC Handling Required? (Yes) / No
Samplers: DANA Heinz
206-263-3005
Shipment method: delivered by DANA HEINZ

Observations, Comments, Special Instructions
Composit sample 1/15 min. 08:15 am → 12:30. (DLH)
VOA vials preserved w/ phosphoric acid upon receipt @ lab, by Login person. (DLH)

Samples received at ___ °C

RELINQUISHED BY	Date	RECEIVED BY	Date
Signature: Dana Heinz	6/3/08	Signature:	6/3/08
Printed Name: DANA Heinz	Time: 1425	Printed Name: Jason Kinnard	Time: 14:25
Organization: Industrian Waste		Organization: KCEL	
RELINQUISHED BY	Date	RECEIVED BY Nhan Phan	Date
Signature: Conrad Vernon	6/4/08	Signature:	6/4/08
Printed Name: CONRAD F. Vernon	Time: 15:40	Printed Name:	Time: 15:40
Organization: VEI		Organization: Friedman & Bruya	

Total Number of Containers: 5 Requested TAT:
Additional Comments:
Samples held @ King County Laboratory under Chain-of-custe
per Conrad Vernon AMEC Earth Environmental
#206/686-2469

RCLLC 0001672

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on June 4, 2008 by Friedman & Bruya, Inc. from the Vernon Environmental, Inc. Rainier Commons, F&BI 806054 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Vernon Environmental, Inc.
806054-01	A00709

Sample A00709 was sent to Aquatic Research for total organic carbon analysis. Review of the enclosed report indicates that all quality assurance was acceptable.

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/20/08
Date Received: 06/04/08
Project: Rainier Commons, F&BI 806054
Date Analyzed: 06/06/08

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL SUSPENDED SOLIDS BY METHOD 2540D

Results Reported as mg/L (ppm)

Sample ID Laboratory ID	Total Suspended Solids
A00709 806054-01	45.9
Method Blank	<10

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/20/08
Date Received: 06/04/08
Project: Rainier Commons, F&BI 806054
Date Extracted: 06/05/08
Date Analyzed: 06/06/08

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR PCBs AS AROCLORS USING EPA METHOD 8082

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Aroclor 1221	1232	1016	1242	1248	1254	1260	1262	Surrogate (% Rec.) (Limit 61-132)
A00709 806054-01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	97
Method Blank	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	76

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 06/20/08
Date Received: 06/04/08
Project: Rainier Commons, F&BI 806054

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL SUSPENDED SOLIDS BY METHOD 2540D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
TSS	mg/L	50	103	89	67-128	15

Date of Report: 06/20/08
Date Received: 06/04/08
Project: Rainier Commons, F&BI 806054

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	% Recovery LCS	% Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	ug/L (ppb)	2.0	88	80	52-135	10
Aroclor 1260	ug/L (ppb)	2.0	86	83	60-128	4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probablility.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - The analyte indicated was found in the method blank. The result should be considered an estimate.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - The sample was extracted outside of holding time. Results should be considered estimates.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - The value reported exceeded the calibration range established for the analyte. The reported concentration should be considered an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The pattern of peaks present is not indicative of diesel.

y - The pattern of peaks present is not indicative of motor oil.

AQUATIC RESEARCH INCORPORATED

LABORATORY & CONSULTING SERVICES

3927 AURORA AVENUE NORTH, SEATTLE, WA 98103

PHONE: (206) 632-2715 FAX: (206) 632-2417

CASE FILE NUMBER:	FBI002-62	PAGE 1	
REPORT DATE:	06/18/08		
DATE SAMPLED:	06/03/08	DATE RECEIVED:	06/06/08

FINAL REPORT, LABORATORY ANALYSIS OF SELECTED PARAMETERS ON WATER SAMPLES FROM FRIEDMAN & BRUYA, INC. / PROJECT NO. 806054

CASE NARRATIVE

One water sample was received by the laboratory in good condition. Analysis was performed according to the chain of custody received with the sample. No difficulties were encountered in the preparation or analysis of this sample. Sample data follows while QA/QC data is contained on the following page.

SAMPLE DATA

SAMPLE ID	TOC (mg/l)
A00709	18.4

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

RCLLC 0001680

Page # 1 of 1

Send Report To Michael Erdahl
Company Friedman and Bruya, Inc.
Address 3012 16th Ave W
City, State, ZIP Seattle, WA 98119
Phone # (206) 285-8282 Fax # (206) 283-5044

SUBCONTRACTER

PROJECT NAME/NO.: 806054
PO #: H-1439

REMARKS
Please Email Results
merdahl@friedmanandbruya.com

TURNAROUND TIME
☒ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Oil and Grease	EPH	VPH	Nitrate	Sulfate	Alkalinity	TOC				Notes
A00709		6/3/08		W	1							X				

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Michael Erdahl	Friedman & Bruya	6/6/08	17:55
Received by:	S. Nelson	ARE	6/6/08	1400
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

Tables and Figures

TABLE 1

SAMPLE DESIGNATION

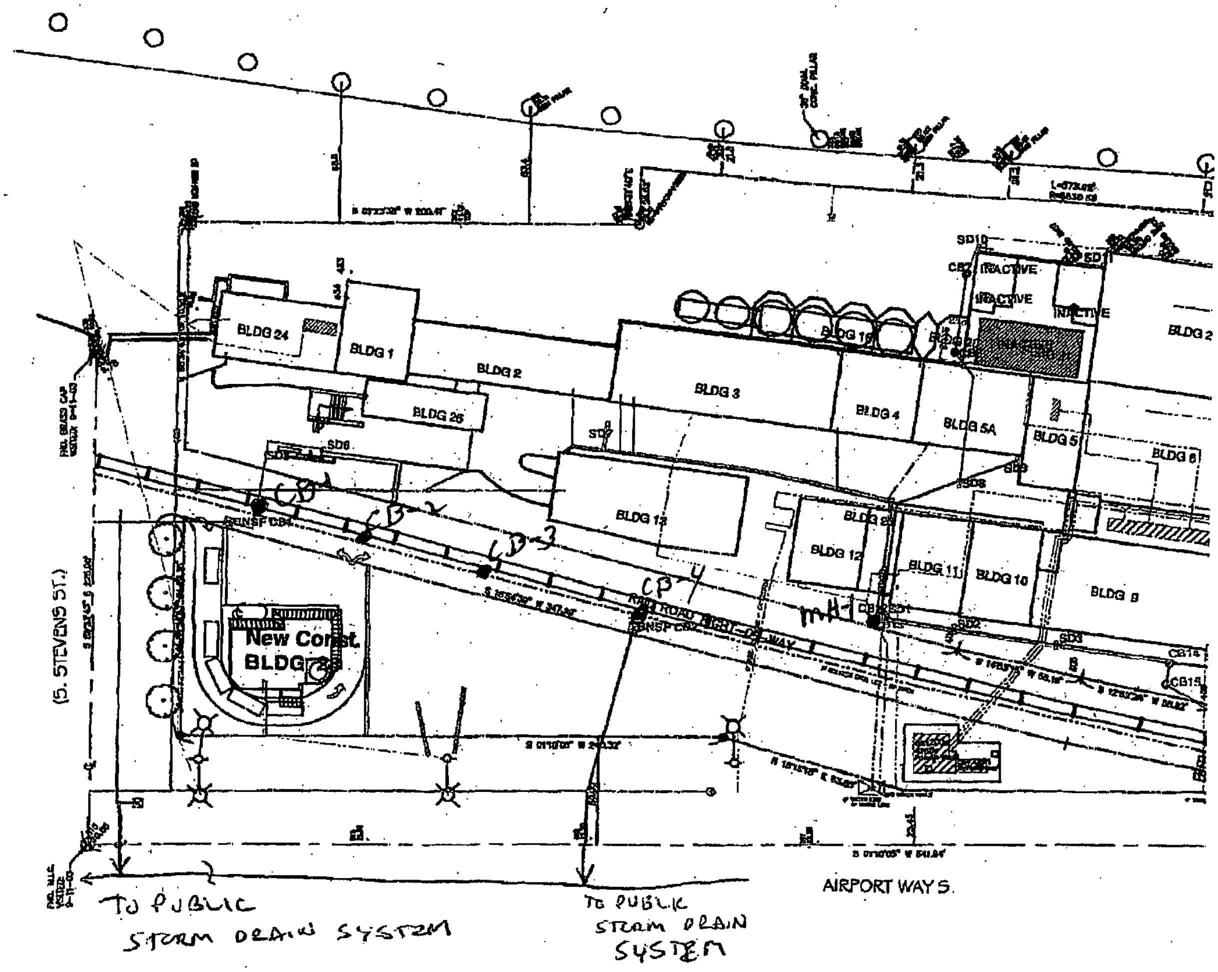
TABLE 1
SAMPLE DESIGNATION

Collected Analytical Samples

Rainier Commons, LLC-Ariel Development
Former Rainier Brewery Propoerty
3100 Airport Way South, Seattle, WA

Matrix	Parameters	Method	TAT (days)	Number of Samples per Sample Location
Catch Basin Sediments	PCB's	EPA 8082	10	1*
Stormwater Effluent	PCB's	EPA 8082	10	1
	Total Organic Carbon (TOC)	SM5310B	10	1
	Total Suspended Solids (TSS)	EPA 2540D	10	1

*Each catch basin sample location consisted of 1-sample collected as a grab composite sediment sample from a 5-point matrix.


BLDG 24
BLDG 1
BLDG 2
BLDG 25
BLDG 3
BLDG 4
BLDG 5A
BLDG 5
BLDG 6
BLDG 13
BLDG 12
BLDG 11
BLDG 10
BLDG 8
INACTIVE
New Const. BLDG
CB-1
CB-2
CB-3
CB-4
MH-1
RAILROAD RIGHT-OF-WAY
(S. STEVENS ST.)
AIRPORT WAY S.
TO PUBLIC STORM DRAIN SYSTEM
TO PUBLIC STORM DRAIN SYSTEM

Vernon Environmental, Inc. (dba: VEI)
3849 Klahanie Drive SE
Suite 9202
Issaquah, WA 98029

Quotation for Services

Client Name:	Ethan Construction, LLC	**VEI Project Manager:**	Conrad Vernon
		Email Address:	Conrad.vernon@comcast.net
Address:	3100 Airport Way South Seattle, WA 98134	**VEI Office Address:**	VEI 3849 Klahanie Drive SE, Suite 9202 Attn: Conrad Vernon Issaquah, WA 98029
Contact:	John jack	**VEI Office Phone:**	206.686.2469
Contact Phone:	425.351.1467	**VEI Office Fax:**	206.686.2469
Email Address:	john@arieldevelopment.com		
Fax Number:	(206) 447-0299	**Proposal Number:**	061013
		Proposal Date:	

Project Name: Former Rainier Brewery – Lead Based Paint (LBP) Survey, LBP & PCB Paint O&M Plans
Project Location: 3100 Airport Way S., Seattle, WA
Scope of Work: LBP identification, quantities, location, photographs, XRF Tech, Report, 167,00 sq ft, drawings, 50 LBP samples for analysis, XRF sampling, Draft LBP and PCB O&M Plans

Category	Item		Est Qty	Rate	Unit	Line Total
Survey	Project Scope:					
		LBP Survey	1	$4,900	Each	$4,900
		LBP O&M Plan	1	$5,000	Each	$5,000
		PCB Paint O&M Plan	1	$5,000	Each	$5,000
Quote Total:						**$14,900**

$ 12500

Deliverables: Reports will be delivered electronically via email. 4-Hardcopy reports will be provided.

The undersigned is an authorized representative of Ethan Construction, LLC and authorizes Vernon Environmental, Inc. to proceed in accordance with the services described above and agrees that Ethan Construction, LLC will be responsible for payment.

Client Name: Ethan Construction, LLC
Authorized Signature:
Title:
Date:

Terms of payment for services are due upon invoice receipt with interest added to unpaid balances as specified on our attached Terms and Conditions, which are included in this proposal.

Enclosures: Terms of Service

ATTACHMENT A
TERMS AND CONDITIONS

TERMS AND CONDITIONS

1.0 SCOPE OF WORK

Vernon Environmental, Inc. (Company) shall perform various environmental technical services to the extent directed by Ethan Construction, LLC (Client) in accordance with this Agreement and the Proposal dated herein.

Client assumes full and complete responsibility for all uses of the work, report and recommendations developed under the assignment.

Company's policy is to maintain a complete file on each assignment for a period of two years from its inception. Thereafter, the complete file will be maintained only on written instructions to do so and payment of a storage fee. When requested, we will take possession of, and store for a period of one year, evidence that is pertinent to our investigation and report. By written request of the Client, it will be retained for additional periods. Company and Client agree that Company will not be held responsible for retention of file material or evidence after those periods.

2.0 PRICE

CLIENT shall pay COMPANY in accordance with the fee outlined in the proposal letter. However, the fee for services will not exceed $16,500.00 unless prior authorization is obtained from CLIENT.

Professional services are provided on a lump sum basis. CLIENT may request an estimate of time or cost required for a project, but unless expressly agreed to the contrary, estimates are for budgeting purposes, not a fixed price quotation.

All time expended for the assignment will be billed, including but not limited to investigations, travel, CLIENT meetings, calculations, review of standards, specifications and drawings, preparation of reports, preparation for testimony, court waiting time and/or standby time requested by CLIENT.

We will invoice you each month for services provided and expenses incurred during the preceding month. Payment shall be made in U. S. dollars. Payments from foreign countries must be made by wire transfer in U.S. dollars as directed by COMPANY. COMPANY may withhold delivery of reports or data, either written or oral, and may suspend the performance of any further service obligations to the CLIENT pending the payment of all invoices greater than 60-days. If CLIENT does not pay COMPANY, through no fault of the COMPANY, within the time payment should have been made pursuant to these Terms and Conditions, the COMPANY may, without prejudice to any other available remedy, suspend or delay shipment, delivery and/or performance of any work for CLIENT until payment of the entire amount owing greater than 60-days is received by COMPANY.

In order to protect the interests of the CLIENT and avoid possible impeachment of testimony, COMPANY personnel are not required to appear for depositions, trials, or hearings pertaining to an assignment, unless all previous billings, greater than 60-days, on this assignment have been fully paid.

In any litigation involving CLIENT, or CLIENT and COMPANY, in which COMPANY is required or compelled by subpoena or judicial order to testify at a deposition or trial, or to produce documents regarding work performed by COMPANY for CLIENT, the CLIENT agrees to compensate COMPANY for all time spent and expenses incurred, including time spent in preparing for such testimony and reasonable attorneys fees incurred in connection with the foregoing. COMPANY will give prompt notice to CLIENT to allow the CLIENT to object to any such testimony or production of documents.

.0 WARRANTEES

COMPANY warrants that the services performed by it hereunder shall be in accordance with good engineering design practices and in conformance with applicable codes and standards established for such work by the industry. Company's liability in regard to the correction of any deficiencies attributable to services performed hereunder shall be limited to redoing without charge, any faulty work performed under this Agreement.

Re-performance of Company's work for a period of one year following completion of its work shall be the exclusive remedy and shall be in lieu of all other remedies, warranties or guarantees, (including any warranty of merchantability or fitness for particular purpose) whether expressed or implied and whether based upon contract, tort (including negligence), statute, strict liability or otherwise.

No other warranty express or implied is made. The Client indemnifies, will defend and hold harmless Company, its officers, directors and employees from any and all third party claims associated with its services.

.0 TERMINATION

Should condition arise which, either in Client's or Company's opinion make it advisable or necessary to discontinue work hereunder, then either party shall have the right to terminate the work by thirty (30) days written notice. Thereafter, COMPANY shall do only such work as may be necessary to protect the work performed or as may be requested by CLIENT. COMPANY shall be paid for the work performed up to and including the date of termination on the same basis as is heretofore set forth.

.0 DELAYS

Neither party shall hold the other responsible for damages or delays in performance caused by acts of God, acts and/or omissions of federal, state and local government authorities and regulatory agencies, or other events which are beyond the reasonable control of the other party that could not have been reasonably foreseen or prevented.

.0 LIMIT OF LIABILITY

It is understood and agreed that the price has been established in recognition that Company's overall cumulative liability for all representations (including Clients indemnification obligation regarding third party claims *arising from Company's negligent or willful acts*), warranties, guarantees, defenses, and other obligations arising as a result of its entering into this Agreement shall in no event exceed the amount paid by CLIENT to COMPANY for performance of the Work.

.0 HAZARDOUS SUBSTANCE CLAIMS

(a) In the event that Company's negligence is found, by final judicial determination, to have caused a Hazardous Substance Claim as defined below; COMPANY shall reimburse CLIENT for its costs and liabilities incurred under this Article to the extent caused by COMPANY, in an amount not to exceed that specified in Article 6.

(b) "Hazardous Substance Claim" shall mean any and all claims, losses, costs, expenses, judgments, damages, and liabilities of any form or nature including but not limited to any for personal or emotional injury, death or damage to property arising out of or in connection with any actual, threatened or feared release, discharge or exposure to any toxic or hazardous waste, substance, material, or vapor, including without limitation, PCBs, petroleum, hydrocarbons, asbestos, mixed, radioactive or nuclear wastes and any other substance designated as hazardous or toxic under CERCLA, TSCA, RCRA or other statute or regulation ("Hazardous Substances").

.0 RELATIONSHIPS OF PARTIES

COMPANY shall at all times be an independent contractor and shall not claim to be an agent, officer, or employee of CLIENT and shall not have authority to make any commitment on behalf of CLIENT, except to the extent that such authority shall be expressly conferred in writing.

.0 TERMS OF PAYMENTS

CLIENT shall pay or cause to be paid to COMPANY for the true and faithful performance of all of services herein and contained under this agreement, the amounts set forth in Company's proposal. Upon completion of the work, every thirty (30) days or as soon thereafter as practicable, COMPANY shall invoice CLIENT for the services performed. Invoices issued to and approved by CLIENT shall be due and payable within 30-days.

0.0 CONFIDENTIALITY

COMPANY agrees not to divulge to third parties, without written consent of CLIENT, any information which relates to the technical or business activities of CLIENT unless: (i) the information is known to COMPANY prior to obtaining the same from CLIENT; (ii) the information is, at the time of disclosure by COMPANY, then in the public domain, or (iii) the information is obtained by COMPANY from a third party who did not receive same, directly or indirectly from CLIENT and who has no obligation of secrecy with respect thereto. COMPANY further agrees not to disclose without the prior written consent of CLIENT, any information developed or obtained by COMPANY in the performance of this Agreement except to the extent that such information falls within one of the categories described in (i), (ii), or (iii) above.

If so requested by CLIENT, COMPANY further agrees to require its employees to execute a nondisclosure agreement prior to performing any services under this Agreement.

11.0 ENTIRE AGREEMENT

The Terms and Conditions and the Engagement Letter shall form the entire agreement between the parties hereto with respect to the subject matter. No oral representations of any officer, agent or employee of COMPANY or CLIENT, either before or after execution of this agreement, shall affect or modify any obligation of either party hereunder. CLIENT agrees that it has not been induced to enter into this agreement by any representations, statements or warranties of COMPANY or any officer, agent or employee of COMPANY, other than those herein expressed.

Venue for any legal action brought pursuant to this contract shall be in Seattle, WA. Washington law will apply to any such proceeding.

VERNON ENVIRONMENTAL, INC.

3949 Klahanie Drive SE, #9202, Issaquah, Washington *P/C/F 206.686.2469*

Catch Basin Sediment Field Sampling Plan (Split Sampling Between Rainier Commons, Seattle Public Utility and King County)

Former Rainier Brewery Property
3100 Airport Way South
Seattle, Washington
King County

Prepared for:

Rainier Commons, LLC
c/o Ariel Development, LLC
Eitan Alon
3317 third Avenue South
Seattle, WA 98134

Prepared by:

Vernon Environmental, Inc.
3524 255th lane SE, Suite 3
Issaquah, Washington 98029

January 3, 2008

Table of Contents

Catch Basin Sediment Field Sampling Plan (Split Sampling Between Rainier Commons, Seattle Public Utility and King County)

Former Rainier Brewery Property

1.0 Site Background

The former Rainier Brewery property is an approximate 4.57-acre parcel located at 3100, Airport Way South, Seattle, WA (the, "Site"). The Site is bound between South Stevens Street to the north, by South Horton Street to the south, by Interstate-5 to the east and Airport Way South to the west. Rainier Commons, LLC (the, "Rainier") owns the Site, which is operated by Ariel Development, Inc. (the, "Ariel"). One-third of the Site is leased to Tully's Coffee. Tully's roasts, grinds, packages, distributes coffee and operates its corporate headquarters on the premises.

The Site was initially developed in the late 1800s as a brewery and functioned in a similar capacity until 1996. The Site has been owned by several entities since its initial development. Separate phases of Site redevelopment has occurred throughout its history. The Site is currently being redeveloped into community mixed use, including but not limited to, residential, commercial and retail space.

Farallon Consulting, Inc. (the, "Farallon") conducted a Phase I Environmental Site Assessment on April 14, 2004. Farallon reported, from their Site reconnaissance, nine (9) pad-mounted electrical transformers at various locations throughout the Site. Farallon also observed oil staining at floor drains adjacent to transformer vaults within several of the buildings and adjacent to abandoned equipment. They did not identify the transformer locations and associated vaults or drains as a Recognized Environmental Condition. Ariel states all of the existing onsite transformers are non-PCB containing.

On October 12, 2005 the City of Seattle's Public Utilities Department (the, "SPU") conducted a stormwater pollution prevention inspection at the Former Rainier Brewery property. Preliminary analytical data from the sediment sampling event at the Site showed concentrations of PCBs (up to 2,200 mg/kg) in the sediment collected from the following locations: the breezeway trench drain, the catch basins in the tank farm area, and two catch basins in the southwest parking lot adjacent to the building and north of the loading dock. Due to the elevated concentrations of PCBs in the sediments, the SPU directed Ariel to employ a consultant/contractor to assist in proper disposal of the material according to appropriate state and federal regulations. They also, directed Ariel to clean all outdoor inlets/trench drains/catch basins/pipes on its property. The SPU recommended additional sampling and analysis of the materials in subject structures to ensure adequate disposal methods are employed. Ariel received the SPU's Corrective Action Letter dated November 22, 2005 directing Ariel to cleanup the affected Site sediments within 30-days.

Ariel received another SPU letter dated January 6, 2006 regarding "Follow-up to Site Meeting on December 12, 2005" which included an extension of their original request to have Ariel cleanup the Site within 30-days. Ariel formally notified the Washington State Department of Ecology (Ecology) about the presence of PCB concentrations in their catch basin sediments during a meeting between Ecology (Dan Cargill) and Ariel (Eitan Alon and its consultant Conrad Vernon of VEI) on January 24, 2006. Ariel agreed to meet the following SPU required compliance contingencies:

- Meeting the content of the SPU's corrective action letter dated November 22, 2005,
- Hiring of a consultant that is experienced in PCB remediation and disposal,
- Jet-cleaning of all lines connecting catch basins (with PCBs in the sediments) to remove any residual contaminated sediment in the lines,
- Notifying the Department of Ecology of the finding of significant concentrations of PCBs at your site as required by law,
- Keeping SPU apprised of ongoing work at the site in a timely manner,
- Showing continuing forward progress with the cleanup, and
- Meeting with SPU on a quarterly basis to re-evaluate the situation. Quarterly meetings commencing in early March 2006.

During Ariel's January 24, 2006 meeting with Ecology, the SPU's catch basin sediment sampling results and Ecology's regulatory approach for the ultimate cleanup of the Site sediments were discussed and agreed. The following items (in order of priority) were identified:

- Provide Methodology Plan for identifying underground subject pipes,
- Identify underground subject pipes with a dye study or other equivalent means to Ecology's satisfaction,
- Provide an as-built drawing of subject underground pipes including inlet points, catch basins, manholes, etc.
- Provide Field work Plans, i.e., Field Sampling Plan, Data Quality Objectives Plan, Quality Assurance/Quality Control (QA/QC) Plan and Health & Safety Plan,
- Collect manhole and catch basin sediment samples, analyze samples, report analytical results,
- Provide a Remedial Action Plan to cleanup the Site sediments in pipes and collection points (i.e., cleanup the catch basin and manhole sediments, as well as jet clean the pipes), and
- Implement the Remedial Action Plan.

Ariel has located and identified subject underground pipes on the Site and has provided an as-built drawing presenting the aforementioned utilities (Figure 1). The Field Work Plans, i.e., Field Sampling Plan, Data Quality Objective Plan, Quality Assurance/Quality Control Plan and the Health & Safety Plan are the next step in complying with the overseeing regulatory authorities requirements.

Sediment Analytical Results:

SPU sampled six (6) sediment sample points for the presence of PCBs at locations discussed above. The analytical results from each location are BNSF CB1-17 mg/kg, BNSF CB2-23 mg/kg, CB 14-175 mg/kg, CB 8-1,340 mg/kg, composite of CB1 through CB6-19.8 mg/kg and CB12-2,200 mg/kg (Figure 1).

On October 4, 2007 KC's Bruce Tiffany and Arnaud Girard, SPU's Beth Schmoyer, VEI's Conrad Vernon, and Rainer Commons' Eitan Alon and John Jack met to discuss potential catch basin sediment containing polychlorinated biphenyl (the, "PCB") that may potentially be discharged from the Site to the Duwamish waterway and wastewater treatment facility located at the Magnolia, Washington treatment facility via KC and SPU storm drains and combined sewer overflows.

VEI compared past SPU PCB analytical results from its October 12, 2005 stormwater pollution prevention catch basin inspection and VEI's catch basin analytical results collected in June 2006 at the Site. VEI showed the concentrations of PCB analytical results, found in the Site catch basin sediments, had decreased from SPU's highest sample concentration of 2,200 mg/kg located in catch basin CB 12 to VEI's CB 12 sediment PCB sample result concentration of non-detect (at a Method Reporting Limit of 0.20 mg/kg) by Advanced Analytical laboratory located in Redmond, WA. SPU and VEI catch basin analytical result trends are presented below.

SPU October 2005 Rainier Commons Catch Basin Sediment Analytical Results (PCB A1254)	**VEI June 2006 Rainier Commons Catch Basin Sediment Analytical Results (PCB A1254)**
BNSF CB-1: 17 mg/kg	BNSF CB-1: 4.3 mg/kg
BNSF CB-2: 23 mg/kg	BNSF CB-2: Non-Detect (ND)
CB-14: 175 mg/kg	CB-14: 0.51 mg/kg
CB-8: 1,340	CB-8: 3.2 mg/kg
CB-1 through CB-6 (composite): 19.8 mg/kg	CB-1: 0.54 mg/kg; CB-2 through CB-6: ND
CB-12: 2,200 mg/kg	CB-12: ND

In an effort to determine whether the PCB source was a result of paint chips released from the facility during painting operations, VEI also collected a paint chip sample. The sample analytical result showed the paint contains 2,300 mg/kg PCB A1254. Based on the paint sample analytical result compared to SPU's catch basin sediment highest PCB analytical result of 2,200 mg/kg, it is highly feasible the paint chips are the source of catch basin sediment impact that may be a result of paint chips migrating from paint chip removal activities to the catch basins during surface run-off precipitation events. Remaining PCB paint on the exterior of the building has been encapsulated through the application of new paint. Moreover, Rainier Commons implemented its PCB Paint O&M Plan in its effort to prevent any future release.

It is Rainier Commons' position that the paint chips are no longer present above regulatory concentration limits in the Site catch basin sediments as the analytical trends show over time. It is Rainier Commons' understanding that KC and SPU are identifying immediately adjacent and hydraulically down gradient catch basin sample locations to the Site. Further, KC and SPU will sample the sediments and storm/wastewater of those identified locations and provide sufficient notice (preferably 10-business days) to VEI before KC's and SPU's sampling event so VEI may be present during split sampling activities, chain of custody and transportation to the selected analytical laboratory(s). Prior to the sampling event VEI requested a copy of KC's and SPU's Field Sampling Plan and/or any other field work plan, i.e., QA/QC Plan, SOPs, so it can incorporate them into VEI's field work plans for split sampling (SPU SAP attached).

Chemical(s)-of-concern (PCBs) will be compared to Ecology's MTCA Method A cleanup levels of 1.0 mg/kg in a soil matrix. Guidance promulgated under federal statutes 40 CFR 761 is also referenced.

This Field Sampling Plan is prepared for on-site sampling activities. The plan includes:

- Sampling objectives
- Sample location and frequency
- Sample Designation
- Sampling equipment and procedures
- Sample handling and analysis

2.0 Sampling Objectives

The sampling objectives, for this sampling event, are to identify potential off-site migration of PCBs and their respective concentrations in sediments at SPU identified down gradient and immediately adjacent off-site catch basin locations. Analytical results

will be used to determine future sediment collection and analysis, as well as, remediation points of cleanup compliance.

Another objective is to demonstrate data identification; decision inputs, decision rule development, decision error limits and design optimization are addressed.

3.0 Sample Location and Frequency

Figure 1 shows the proposed sediment grab/composite sample locations (these are numbered catch basins). SPU has identified three (3) hydraulically down gradient, immediately adjacent and off-site catch basin sample locations, i.e., a Tully Line Catch Basin, a South Stevens Catch Basin and an Airport Way South Catch Basin. The catch basins and trench drains collect surface drainage and convey it to the storm drain lines (pipes). Selection of these locations assumes the sediment grab/composite sample locations cover the impacted area(s) of the Site underground stormwater utilities and the samples are at locations hydraulically down-gradient in the drainage system, immediately adjacent and will therefore, be representative of Site hydraulically up-gradient underground utility conditions.

Sediment samples will be collected and analyzed from each of three (3) catch basin locations during this sampling event as grab/composite sediment samples (Section 5) and in-line sampling methodology as described in the SPU Sampling and Analysis Plan (SAP) (Appendix A).

4.0 Sample Designation

Collected sediment samples will be designated as shown in Table 1. Sampling guidelines are provided in Table 2. The sampling point locations include end of pipe collection of Site stormwater system at each of three (3) catch basins. Sediment grab/composite samples will be collected for one chemical-of-concern, i.e., PCBs at each sample location.

One (1) duplicate from one (1) catch basin will be collected for quality control purposes.

5.0 Sample Equipment, Procedures and Handling

Vernon Environmental, Inc. (VEI) will collect split sediment grab/composite and sediment in-line samples at the locations identified.

EPA prescribed method protocols regarding sample collection, cross contamination prevention, sample preservation, sample container type, sample holding temperature, and holding times will be followed (Table 2).

Sediment Sample Collection

Gloves will be worn at all times while collecting sediment samples. Descriptions of field observations (including oil sheens and potential contributing activities) and sample

characteristics (odor, amount and type of particles being removed, size description, color) will be included in field notes recorded during sample collection.

Catch Basin Sediment

Catch-basin end of pipe sediment samples will be collected using stainless steel spoons and long-handled scoops or soil coring devices. Samples will be collected from end of pipe sediment accumulated in the catch basin sump or in-line structure during pipe jetting operations. Individual aliquots will be collected from the end of pipe sediments placed in a stainless steel bowl, and thoroughly mixed. Any particles greater than 2 centimeter in size will be removed from the sample and discarded. After mixing, three (3) - 250gram aliquot samples (split samples collected for SPU, KC and Rainier Commons) will be removed and placed into pre-cleaned sample containers provided by the analytical laboratory. Samples will be placed in a cooler and stored on ice until delivered to the analytical laboratory. Three (3) split samples will also be collected from decanted vactor truck sediments (please reference the Data Quality Objective Plan regarding representative sediment sample collection and analysis not reflecting Site conditions).

Equipment Decontamination

All sampling equipment including stainless-steel materials will be decontaminated prior to each sampling event. The following decontamination procedures will be followed after every sampling event:

Stainless-Steel Scoop and Mixing Bowl

- Phosphate-free detergent wash and tap water rinse
- Reagent-grade water rinse
- Ultra-pure methanol rinse
- Air dry
- Wrapped in new aluminum foil and bagged in plastic.

After the decontamination procedures have been completed, the sampling equipment will be capped or sealed with new aluminum foil and the sampling device will be protected and kept clean.

Each sample will be clearly marked with the date and time of sample collection, sample collection technician's name, unique sample identification, preservative used and analysis to be performed. Each sample will be sealed with chain-of-custody tape. Each sample cooler will contain blue ice (or equivalent) to keep the temperature below 40 degrees Fahrenheit. Each sample cooler will be chain-of-custody sealed and a chain-of-custody form will be completed in triplicate and placed in the cooler prior to sealing and shipment.

6.0 Sample Analysis

Collected sediment sample analyses are presented in Table 1.

Tables and Figures

TABLE 1

SAMPLE DESIGNATION

Collected Analytical Samples				
Rainier Commons, LLC-Ariel Development Former Rainier Brewery Property 3100 Airport Way South, Seattle, WA			Sample Date: Week of 1/7/08	
Matrix	**Parameters**	**Method**	**TAT (days)**	**Number of Samples per Catch Basin Location**
Hydraulically down Gradient Catch Basin Sediments	PCBs	EPA 8082	3	1*
Duplicate	PCBs	EPA 8082	1	*

**Each sample location will consist of 1-sample collected as a grab composite sediment sample from a five- (5) point matrix (1-center and 4-corners of each catch basin).*

**Duplicate sample to be collected at 1-catch basin*

TABLE 2

SAMPLING GUIDELINES

Catch Basin Sediment Sampling Guide - Former Rainier Brewery					
Analysis	**Specific Method**	**Container**	**Preservation**	**Hold (days)**	**Amount Needed**
Polychlorinated Biphenyls by EPA Method 8082 in Soil					
8082 PCB Only	EPA 8082	Glass jar w/PTFE seal	Store cool at 4°C	14	250 grams
Polychlorinated Biphenyls by EPA Method 8082 in Wipe					
8082 PCB Only	EPA 8082	Glass jar w/PTFE seal	Store sealed at STP	14	One wipe in Hexane

Attachment

Data Quality Objectives, QA/QC Plan, Conceptual Site Model

SAMPLING AND ANALYSIS PLAN

Diagonal Avenue South Drainage Basin Pollutant Source Investigation

Prepared for

Seattle Public Utilities

June 2003

SAMPLING AND ANALYSIS PLAN

Diagonal Avenue South Drainage Basin Pollutant Source Investigation

Prepared for

Seattle Public Utilities
Drainage and Wastewater Division
710 Second Avenue
Seattle, Washington 98104

Prepared by

Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121
Telephone: 206/441-9080

June 2003

Contents

Tables

Figures

Introduction

Seattle Public Utilities (SPU) is partnering with the King County Industrial Waste, Public Health, and Hazardous Waste Programs to conduct pollutant source control activities for the Lower Duwamish Waterway Superfund investigation. The site was placed on the National Priorities list in 2001 due to the presence of contaminants in the waterway sediments, particularly polychlorinated biphenyls (PCBs), phthalate esters and other semi-volatile organic compounds (SVOCs), and metals (arsenic, copper, lead, mercury, tributyltin). A large part of the source control program is a business inspection effort to identify potential ongoing sources and to work with businesses in the area to reduce the amount of pollutants currently discharged to the waterway via storm drains and combined sewer overflows (CSOs). Understanding and controlling ongoing sources of contaminants to the river is very important to minimize the potential for sediment recontamination following cleanup.

To support the business inspection efforts, SPU will conduct source tracing and identification investigations in the study area. This information will be used to prioritize business inspections in specific areas where the contaminants of concern (COC) for the waterway sediments are found in the SPU drainage system. In addition, source source sampling information will be used to confirm the presence/absence of COCs at individual sites within the SPU collection system that is tributary to the lower Duwamish Waterway. The following types of samples will be collected as part of this effort:

- Onsite catch basin sediment
- Right-of-way catch basin sediment
- Inline manhole sediment (where available in sufficient quantity for analysis)
- Inline suspended sediment.

The Diagonal/Duwamish area is the first of seven early action sites identified for the Duwamish Waterway (Windward 2003). Early action sites are areas that have been recommended for cleanup on an accelerated scheduled because they pose a relatively higher risk to human health or the environment. Contaminants that exceed the sediment management standards in the Diagonal/Duwamish early action area include include PCBs, bis(2-ethylhexyl) phthalate (BEP), butylbenzyl phthalate (BBP), carcinogenic PAHs, and other semi-volatile organic compounds (SVOC), arsenic, mercury, and zinc. Cleanup of contaminated waterway sediment was completed in March 2004.

In 2002, SPU began removing accumulated sediment from the lower portion of the Diagonal Ave S CSO/SD system. SPU crews cleaned the two laterals (approximately 2,800 lineal feet) and in 2003, a contractor began work on the mainline and the S Dakota St lateral. Approximately 498 CY of sediment was removed from the Diagonal system in 2002-2003 and transported to a nearby cement plant, where it was reused in the cement manufacturing process.

SPU plans to clean the remaining 600 feet in the S Dakota lateral in 2004. Work is scheduled to begin in July and be performed by SPU crews. Sediment removed from the drain will be dewatered at an SPU vactor decant facility and disposed by SPU's solid waste disposal contractor.

The Diagonal Ave S CSO/SD, which discharges directly to the early action site, is the largest storm drain in the Seattle storm drainage system. It is referred to as a CSO/SD because it receives stormwater runoff from the surrounding area and also discharges combined sewer overflows from both the King County interceptor system and the local Seattle combined sewer system.

This report describes the sampling activities that will be conducted by SPU to assist in identifying ongoing sources of contaminants in the Diagonal Ave S CSO/SD system. It is intended to act as a template for source sampling to be conducted in other early action sites. Included in this report are a site description and summary of historic studies in the project area. The project organization and schedule is briefly presented, and the project sampling design is described. Data quality objectives, field and laboratory procedures, and data quality assessment and data management procedures are also presented. This plan has been prepared according to guidelines developed by the Washington Department of Ecology (Ecology 2001).

Project Description

The Diagonal Avenue South Drainage Basin Pollutant Source Investigation will apply a targeted approach to identify sources of contaminants to the waterway. Implementation of this project will continue over several years. The approach for the Diagonal basin study will be applied to other early action sites in the Lower Duwamish Superfund drainage area to support source control activities. As mentioned earlier, SPU is working with King County to identify and control potential sources of contaminants to the Duwamish Waterway. A preliminary plan for coordinating inspection and enforcement activities at businesses operating within the basin has been developed and presented to the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology).

The goals of the project are to identify sources of pollutants to the waterway sediments from stormwater discharges and to evaluate the effectiveness of source control methods using high-quality data collected by SPU as part of its pollutant source investigation efforts in the Diagonal Ave S CSO/SD system. Sediment and stormwater samples will be collected from various sites in the basin for analysis of the following pollutants of concern: arsenic, mercury, polychlorinated biphenyls (PCBs), and phthalates. Sediment and stormwater samples will also be analyzed for additional common stormwater metals (i.e., copper, lead and zinc) and organics (i.e., polycyclic aromatic hydrocarbons). To facilitate the evaluation of analytical results, sediment samples will also be analyzed for total organic carbon (TOC) and grain size, and stormwater samples will also be analyzed for total suspended solids and hardness.

The information obtained will allow SPU to focus business inspections on high priority areas and assist in identifying potential contaminant sources in the Diagonal drainage basin. Data may also be used to assist King County in the development of a near-field model for the nearby combined sewer overflow (CSO) outfalls.

Site Description

The Diagonal Ave S CSO/SD basin discharges into the lower Duwamish Waterway via an outlet structure that contains two 12-foot by 9-foot openings located at S Oregon St at approximately river mile 0.5 (Figures 1 and 2). The Diagonal storm drain basin encompasses approximately 2,600 acres that includes a significant portion of the south Seattle light industrial area, commercial areas along Rainier Ave S, and residential areas along Beacon Hill. Approximately 3.5 miles of I-5 also drain to the Diagonal system. The average annual discharge from the Diagonal drainage system has been estimated at approximately 1,200 million gallons per year (King County et al. 2001). The Hanford (stormwater/CSO conveyance) tunnel connects the western and eastern parts of the basin. The Diagonal outfall also receives combined sewer overflows from the City of Seattle (approximately 624 acres) and King County combined sewer systems (approximately 4,900 acres). Seattle Public Utilities operates and maintains six separate overflows and King County operates one overflow to the Diagonal drainage system (see Figure

2). The total Seattle CSO discharge rate is estimated to range from 0.6 to 5 million gallons per year based on monitoring records for 1998 through 2001. The King County CSO discharge rate has been estimated at about 65 million gallons per year (King County et al. 2001).

The Diagonal drainage system is tidally-influenced throughout a large portion of the lower drainage system. Based on mean higher high water (MHHW) data and existing information from SPU's geographic information system (GIS) database, tidal influence within the drainage system extends as far upstream as Airport Way South.

Previous Studies

Several studies and reports have described sediment and stormwater conditions in the Diagonal storm drain system, most often in the context of potential impacts to the Duwamish Waterway. These studies are briefly summarized below in terms of the contaminants of concern for the current project. For reference, sediment and water quality standards for contaminants of concern and other select parameters are presented in Table 1.

Table 1. Marine sediment and water quality criteria for selected parameters.

	Sediment [a]	Water [b]
Arsenic	57 mg/kg DW	36.0 µg/L
Copper	390 mg/kg DW	3.1 µg/L
Mercury	0.41 mg/kg DW	0.025 µg/L
Lead	450 mg/kg DW	8.1 µg/L
Zinc	410 mg/kg DW	81.0 µg/L
Total PCBs	12 mg/kg OC	0.03 µg/L
Bis(2-ethylhexyl) phthalate	47 mg/kg OC	2.2 µg/L
Butylbenzyl phthalate	4.9 mg/kg OC	1,900 µg/L
Dimethyl phthalate	53 mg/kg OC	1,100,000 µg/L
Di-n-butyl phthalate	220 mg/kg OC	4,500 µg/L

[a] Sediment quality standard (SQS) for marine sediment (WAC 173-204). Criteria are based on dry weight (DW) for metals and organic carbon (OC) for organics.
[b] Marine water chronic criteria for metals and total polychlorinated biphenyls (PCBs) (WAC 173-201A). Human health criteria for consumption of organisms only for phthalates (EPA 2002b).

Seattle Public Utilities Diagonal Storm Drain Cleaning Preparation

Tetra Tech (2002) collected sediment and decant water samples in January and February 2002 to characterize the storm drain sediment prior to cleaning the Diagonal Ave S CSO/SD. One sediment sample was collected from each of six locations on the main line and five locations on lateral (tributary) lines in the lower part of the basin (downstream of 4th Ave S). The sediment samples were analyzed for metals, total petroleum hydrocarbons, semivolatile organic compounds (SVOCs), total organic carbon (TOC), pesticides/PCBs, and grain size. However,

samples collected from the outfall were analyzed only for metals due to insufficient sediment volume (Tetra Tech 2002).

Arsenic and mercury were not detected in sediment samples at levels above the respective practical quantitation limit (PQL) or Washington State sediment quality standard (SQS) (WAC 173-204). Concentrations of bis(2-ethylhexyl) phthalate exceeded the SQS (47 µg/mg organic carbon) at nine of ten locations. No other phthalate esters were detected above the PQL or SQS. None of the samples exhibited PCB concentrations above the PQL, but PCBs were detected below the PQL at three lateral line locations, with one location exceeding the SQS (12 mg/kg) for Aroclor 1254, Aroclor 1260, and total PCBs.

King County Stormwater Data

In 1995, King County collected stormwater samples during several storm events from two locations within the Diagonal storm drain system; one on a lateral drain line (three storms) and one on the main line (seven storms). The mainline storm drain is located at S Hinds St and 6th Ave S, and the lateral line storm drain is located at S Horton St and 8th Ave S. The samples were analyzed for conventionals, metals, semi-volatile organic compounds, pesticides, PCBs, and volatile organic compounds, including the contaminants of concern for the Diagonal basin project (King County 1995).

Arsenic concentrations in the three lateral line samples averaged 2.49 µg/L and ranged from 1.60 to 2.83 µg/L. Arsenic levels in the seven main line samples averaged 2.86 µg/L and ranged from 1.9 to 3.71 µg/L. All arsenic concentrations were below the Washington State marine acute (69.0 µg/L) and chronic (36.0 µg/L) water quality criteria (WAC 173-201a). Mercury was detected in only one sample from the main line storm drain (South Horton Street). The mercury level (0.32 µg/L) in that sample exceeded the Washington State marine chronic criterion (0.025 µg/L) (WAC 173-201a), but not the acute criterion (1.8 µg/L).

Four phthalate compounds (bis[2-ethylhexyl] phthalate, butylbenzyl phthalate, di-n-butyl phthalate, and dimethyl phthalate) were detected in stormwater samples collected from both storm drain locations. Although aquatic toxicity criteria have not been established for any phthalate compound, EPA (2002) has established water quality criteria for phthalates to protect human health from consumption of aquatic organisms (see Table 1). None of the phthalate results exceeded the human health criteria for bis(2-ethylhexyl) phthalate (0.0022 mg/L), butylbenzyl phthalate (1.9 mg/L), di-n-butyl phthalate (4.5 mg/L), or dimethyl phthalate (1,100 mg/L). PCBs were not detected in any stormwater sample and the detection limits were less than the Washington State marine chronic criterion (0.03 µg/L) (WAC 173-201a).

Pesticides and PCBs were not detected in any of the samples; detection limits ranged from 0.02 to 0.5 ug/L. Volatile organic compounds (VOC) were infrequently detected. The following four VOC were detected in at least one sample: 1,1,1-trichloroethane, acetone, tetrachloroethylene, and trifluorotoluene.

Elliott Bay/Duwamish Restoration Program

Between August 1994 and September 1996, King County Department of Natural Resources collected sediment samples in the Duwamish Waterway near the Diagonal outfall as part of the Elliott Bay/Duwamish Restoration Program (King County et al. 2001). The purpose of the sampling effort was to delineate the extent and magnitude of sediment contamination in the vicinity of four outfalls (Diagonal Ave S CSO/SD, Diagonal Ave S SD, old wastewater treatment plant outfall, and the King County Duwamish pump station overflow), and to recommend the size of a cleanup area.

Surface sediment samples were collected at 34 stations located in the vicinity of the Diagonal outfall (i.e., in the North Inshore Area located inshore of the dredged navigation channel and within 400 feet upstream and 800 feet downstream of the Diagonal outfall). Contaminant levels were compared to sediment quality standards (SQS) and cleanup screening levels (CSL) (Chapter 173-204 WAC). Based on those comparisons, contaminants of concern were identified as:

- PCBs (24 SQS exceedances, 6 CSL exceedances)
- Mercury (5 SQS exceedances, 2 CSL exceedances)
- Bis(2-ethylhexyl) phthalate (9 SQS exceedances, 27 CSL exceedances)
- Butyl benzyl phthalate (23 SQS exceedances, 3 CSL exceedances).

Compounds were also evaluated for human health risks based on contaminant levels in fish tissue samples collected near the two outfalls (PSAMP 1992 as referenced in King County et al. 2001). Contaminants of concern for human health risks were identified as PCBs, total DDT, and arsenic.

As part of the discussion of potential contaminant sources in the study area, results were presented for sediment samples collected from within the Diagonal storm drain system by the City of Seattle Drainage and Wastewater Utility in 1994. Results indicated no SQS exceedances for metals. However, concentrations of bis(2-ethylhexyl) phthalate exceeded the CSL criterion (78 mg/kg organic carbon) in three of four samples.

Project Organization and Schedule

SPU will collect all sediment samples. SPU will install suspended sediment traps in the drainage line at six locations. The sediment samples will be analyzed by Analytical Resources, Inc. (ARI), Brooks Rand, Ltd., and Am Test Laboratories.

SPU will deliver all samples to ARI for analysis. ARI will conduct all analyses with the exception that Am Test Laboratories will analyze the sediment samples for grain size.

Project personnel and quality assurance responsibilities are listed below:

Seattle Public Utilities (SPU) 700 5th Ave, 44th floor Seattle, WA 98104	Mailing Address: 700 Fifth Avenue, Suite 4900 PO Box 34018 Seattle, WA 98104-4018
Project Manager/QA Officer:	Beth Schmoyer (206) 386-1199 Email: beth.schmoyer@seattle.gov
Field Lead	Mike Hinson (206) 733-9134 Email: michael.hinson@seattle.gov
Analytical Resources, Inc. (ARI) 4611 South 134th Place Tukwila, WA 98168-3240	
Project Manager:	Mark Harris (206) 621-6490 Email: mark@arilabs.com
Am Test Laboratories 14603 NE 87th Street Redmond, WA 98052	
Project Manager:	Kathy Fugiel (425) 885-1664 Email: (b) (6)

The project schedule is presented by task in Table 2 for the first 2 years of the study. The task schedule may change for Year 2 and subsequent years depending on the Year 1 results.

Table 2. Schedule of the Diagonal Avenue South drainage basin pollutant source investigation.

Task	Schedule
Catch basin sediment sampling	Begin August 2003 and continue for duration of source tracing effort
In-line sediment grab sampling	April 2003 –September 2003
In-line sediment trap sampling	Begin 2003. Install traps for 6-month periods (September–February and March – August). Continue for duration of source tracing effort
Project report	Results to be included in biannual source control reports to EPA and Ecology

Sampling Design

Three types of sediment sampling will be employed to maximize coverage of the Diagonal drainage basin and to gather information on the extent and location of contaminants. In addition, stormwater samples will be collected near the outfall into the Duwamish Waterway with a flow-weighted, automated sampler to evaluate overall contaminant levels in the basin drainage. Each of these four study components are described below, followed by the sample analysis procedures. Table 3 outlines the sampling design including sample site location, project and quality control sample frequency, and analyses to be performed.

Table 3. Sampling design for each year of the Diagonal drainage basin pollutant source investigation.

Sample Sites	Site ID	Project and Field QC Samples	Analyses
Catch Basin Sediment			
Up to 75 sites to be determined during business inspections	CB#	▪ 1 sediment grab/site (up to 75 samples/year) ▪ 1 field duplicate/20 samples	▪ TOC, grain size ▪ Arsenic, mercury, copper, lead, zinc ▪ PCBs ▪ SVOCs
Sediment Traps[a]			
W of E Marginal Way S	ST1	▪ 1 sediment composite/site ▪ 1 field duplicate at 1 of 6 sites	▪ TOC, grain size ▪ Arsenic, mercury, copper, lead, zinc ▪ PCBs ▪ SVOCs
Airport Way S south of I90	ST2		
S Forest St	ST3		
MLK Jr. Wy	ST4		
S College St	ST5		
S Bush St	ST6		
S Dakota St	ST7		
In-line Sediment[a]			
E Marginal Way S	MH1	▪ 1 sediment grab/site ▪ 1 field duplicate at 1 of 6 sites	▪ TOC, grain size ▪ Arsenic, mercury, copper, lead, zinc ▪ PCBs ▪ SVOCs
Airport Way S	MH2		
S Forest St	MH3		
MLK Jr. Way	MH4		
S College St	MH5		
S Bush Pl	MH6		
S Dakota St	MH7		

a. See Figure 2 for station locations.

Catch Basin Sediment

As part of the business inspection effort, SPU inspectors will collect on-site catch basin sediment samples to confirm the presence or absence of COCs found in the waterway sediments. Samples

will be collected if there is evidence of contaminants that might enter the drainage system (i.e., oil sheen, odors, known chemical use, and observed activities that might produce contaminants). Approximately 1,000 businesses will be inspected, with sediment collection occurring at 50 to 75 catch basins. One sediment sample will be collected from each catch basin exhibiting evidence of contamination.

SPU will also collect sediment samples from catch basins located in the public right-of-way to evaluate contributions from roadways. Samples will be collected from a variety of roadways (e.g., residential streets, arterials, and highways) within the Diagonal Ave S basin. Approximately 40 to 50 samples will be collected from the right-of-way.

Sediment Traps

Sediment traps will be installed in storm drains at the following seven locations (see Figure 2):

- ST-1: E Marginal Way S and S Oregon St (Manhole #D056-126).
- ST-2: Airport Way S and West Seattle Bridge, eastbound (Manhole # D057-021).
- ST-3: S Forest St and 8th Ave S (No manhole #)
- ST-4: S Winthrop St and Martin Luther King Jr. Way (Manhole #D052-403).
- ST-5: Rainier Ave S and S College St (Manhole #D052-138)
- ST-6: Rainer Ave S and S Bush St (Manhole #D045-098)
- ST-7: S Dakota St and 6th Ave S (Manhole #D057-090).

Sediment trap samples will be collected in pre-cleaned, one-liter wide mouth Teflon containers. At each sampling location, two sediment traps will be mounted to the wall of the manhole or pipeline just above the base flow level within the storm drain to collect sediment associated with storm flows. Each sediment trap consists of a stainless-steel bracket and housing that holds a Teflon sample container (Figure 3). The sediment traps were fabricated for SPU based on an initial design by Ecology (1996) and modifications by the City of Tacoma (2001).

Sediment traps will be deployed for approximately 6-month intervals. Traps will be installed from September to about February to capture winter storm flows and again from March to August to collect spring-summer storm flows.

In-line Sediments

If possible, sediment that accumulates within the storm drain at the sediment trap will also be sampled. If sufficient sediment is present, SPU staff will collect one in-line sediment sample at each sediment trap location listed above. The in-line sediment samples will be collected during retrieval of the sediment trap samples to allow for the analysis of both samples in the same analytical batch.

Sample Analysis

Sediment samples will be analyzed for the parameters of concern (arsenic, mercury, PCBs and semi-volatile organic compounds, including phthalate esters), as well as other common stormwater pollutants (i.e., copper, lead, zinc, and polycyclic aromatic hydrocarbons). Sediment samples will also be analyzed for grain size and TOC to facilitate the comparison of results to sediment standards (WAC 173-204). If insufficient sediment is collected for any sample, the analyses will be prioritized in the following order: PCBs, SVOCs, arsenic, mercury, copper, lead, zinc, total organic carbon, and grain size. Water samples will also be analyzed for total suspended solids and hardness to facilitate evaluation of the results and comparison to water quality standards (WAC 173-201A). Table 4 presents the analytical methods to be used for this project.

Table 4. Analytical parameters and methods.

Parameter	Method [a]	Type	Sample Container	Holding Time [b]	Preservation
Sediment					
Total organic carbon	415.1	combustion	125 mL HDPE [c]	6 months	Cool to 4°C
Grain size	PSEP	sieve	250 mL HDPE	6 months	Cool to 4°C
Arsenic	6010	ICP	125 mL HDPE [c]	6 months	Cool to 4°C
Mercury	7471	CVAA	125 mL HDPE [c]	28 days	Cool to 4°C
Copper	6010	ICP	125 mL HDPE [c]	6 months	Cool to 4°C
Lead	6010	ICP	125 mL HDPE [c]	6 months	Cool to 4°C
Zinc	6010	ICP	125 mL HDPE [c]	6 months	Cool to 4°C
PCBs	8082	GC-ECD	250 mL glass	14 days; 40 days	Cool to 4°C
SVOCs	8270	GC-MS	250 mL glass	14 days; 40 days	Cool to 4°C

[a] EPA-approved methods in EPA 1983, 1994, and 2002a and in PSEP 1997.
[b] For PCBs and semivolatile organic compounds, holding times are for extraction and analysis of the elutriate.
[c] One container for total organic carbon, arsenic, mercury, copper, lead, and zinc in each sediment sample.
ICP – Inductively-coupled plasmaspectrometer.
CVAA – Cold vapor atomic absorption.
GC-ECD – Gas chromatograph-electron capture detection.
GC-MS – Gas chromatograph-mass spectrometer.
ICP-MS – Inductively coupled plasma-mass spectrometer.
CVAF – Cold vapor atomic fluorescence.
HDPE – High density polyethelene

Data Quality Objectives

The goal of this project is to collect data that will assist in locating sources of stormwater pollutants and help focus agency business inspections on high priority areas in the Diagonal Ave S CSO/SD drainage basin. The sampling activities may also provide input to a near-field sediment recontamination model currently being developed by King County.

Data quality objectives for the laboratory analyses are presented in Table 5 and described in separate sections below. The overall quality control objective is to ensure that data of a known and acceptable quality are collected for this project. A table of the analytical laboratory's control limits is presented in Appendix B.

Table 5. Accuracy, precision, and reporting limit objectives for analytical parameters.

Parameter	Reporting Limit [a]	Accuracy (percent recovery)	Precision (relative percent difference)
Sediment			
Total organic carbon	200 mg/kg	75 – 125%	≤ 20%
Grain size	NA	NA	NA
Arsenic	5.0 mg/kg	75 – 125%	≤ 20%
Mercury	0.05 mg/kg	75 – 125%	≤ 20%
Copper	0.2 mg/kg	75 – 125%	≤ 20%
Lead	2.0 mg/kg	75 – 125%	≤ 20%
Zinc	0.6 mg/kg	75 - 125%	≤ 20%
SVOCs	67 µg/kg [b]	50 – 150%	≤ 50%
PCBs	5 µg/kg	50 – 150%	≤ 50%

[a] Reporting limits for sediments are reported as dry weight.
[b] Reporting limits vary for semivolatile organic compounds; the reporting limit presented is for the phthalate esters.

Accuracy and Bias

Accuracy and bias, the degree to which the analytical results reflect the true value of the sample, will be assessed using analyses of laboratory preparation blanks, matrix spikes, and control standards. Values for blanks will not exceed 2 times the reporting limit. Generally, the percent recovery of matrix spikes will be between 75 and 125 percent for metals (mercury and arsenic) and between approximately 50 and 150 percent for organics (PCBs and semivolatile organic compounds). Matrix spike recovery limits for individual compounds may vary outside these ranges. A table of the analytical laboratory's recovery limits for individual compounds are presented in Appendix B. The percent recovery of control standards will be within control limits reported by the analytical laboratory that are based on historic performance.

The analytical laboratory will implement several steps to increase the accuracy of the PCB analyses. Initially, samples will be extracted and the extracts analyzed for PCBs. If there is background contamination or interference, the extracts will be acid cleaned with sulfuric acid and re-analyzed. If background interference is still apparent, the extract will be cleaned again with potassium permanganate and re-analyzed.

Precision

Precision is a measure of the scatter in the data due to random error caused primarily from sampling and analytical procedures. Precision will be assessed using laboratory duplicates and field duplicates. Laboratory duplicates will be analyzed with every sample batch. Field duplicates will be analyzed at the frequency identified in Table 3.

Two levels of precision for duplicate analyses will be evaluated. The relative percent difference (RPD) between laboratory duplicates will be less than 20 percent for metals and less than 50 percent for organics if both duplicate values are greater than 5 times the reporting limit. The difference between laboratory duplicates will be ±1 times the reporting limit for metals and ±2 times the reporting limit for organics if either duplicate is less than or equal to 5 times the reporting limit. For organic analyses, precision will be determined between the matrix spike and matrix spike duplicate (MSD).

Representativeness

The sampling program is designed to provide samples that reflect pollutant concentrations in stormwater and sediments in the Diagonal drainage basin. Sample representativeness will be ensured by employing consistent and standard sampling procedures (see below). Stormwater samples will be collected as flow-weighted composites using an automatic sampler, flow meter, and conductivity meter to characterize stormwater for the Diagonal drainage system that is not influenced by tides. Equipment decontamination and sample handling procedures will be employed to prevent contamination of sediment and stormwater samples.

Completeness

A minimum of 95 percent of the samples submitted to the laboratory will be judged valid. It is anticipated that all samples will be collected. An equipment checklist will be used to prevent loss of data resulting from missing containers or inoperable instruments prior to embarking on field sampling trips. Automatic recording equipment will be checked regularly to ensure that it is in good working order.

Comparability

Data comparability will be ensured through the application of standard sampling procedures, analytical methods, units of measurement, and detection limits. The results will be tabulated in standard spreadsheets for comparison with threshold limits and background data.

Field Procedures

This section describes field procedures that will be utilized to ensure that samples are collected in a consistent manner and are representative of the matrix being sampled, and the data will be comparable to data collected by other existing and future monitoring programs. Procedures are described for collecting stormwater and sediment samples, decontaminating sampling equipment, and recording field measurements and conditions. Requirements for sample containers and preservation, sample identification, and field quality control procedures are also described. Sampling procedures will generally follow *Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound* (PSEP 1997).

Sediment Sample Collection

Sediment samples will be collected following PSEP (1997) guidelines for sediment sample collection. Gloves will be worn at all times while collecting sediment samples. Descriptions of field observations (including oil sheens and potential contributing activities) and sample characteristics (odor, amount and type of particles being removed, size description, color) will be included in field notes recorded during sample collection. All sediment collection equipment will be decontaminated following PSEP guidelines (see below).

Catch Basin and In-Line Sediment

Catch-basin and in-line sediment samples will be collected using stainless steel spoons and long-handled scoops or soil coring devices. Samples will be collected from the top 3-4 inches of sediment accumulated in the catch basin sump or in-line structure. Individual aliquots will be collected from at least three locations in the sump/structure, placed in a stainless steel bowl, and thoroughly mixed. Any particles greater than 2 centimeter in size will be removed from the sample and discarded. After mixing, samples will be placed into pre-cleaned sample containers provided by the analytical laboratory. Samples will be placed in a cooler and stored on ice until delivered to the analytical laboratory.

In-Line Sediment Traps

Sediment traps will be inspected on a bi-monthly basis. If sufficient sediment has accumulated (e.g., greater than 500 mL), samples will be collected and the trap will be redeployed with a new, pre-cleaned sample container. If possible, samples will be collected after a period of three days of dry weather to allow for additional settling of particulate and colloidal materials. The sample containers will be removed from the sediment trap in a manner that will minimize resuspension of sediment and the height of sediment within the sample container will be measured to the nearest millimeter. The samples will be delivered directly to the analytical laboratory for

processing in the original Teflon sample containers. Samples will be preserved according to PSEP guidelines (see Table 4).

Sample Containers, Preservation and Holding Times

Pre-cleaned sample containers will be supplied by the analytical laboratory for the required analyses. Spare sample containers will be carried by the field samplers in case of breakage or possible contamination. Sample containers, preservation techniques, and holding times will follow PSEP (1997) guidelines (see Table 4).

Sample Identification and Labeling

A unique site number (see Table 3) and the date of collection will identify each sample (e.g., ST1-032803-1 for the first sample collected from the sediment trap located at East Marginal Way on March 28, 2003). Prior to filling, sample containers will be labeled with the following information using indelible ink:

- Sample identification number
- Date of collection (day/month/year)
- Time of collection (military format)
- Project name (Diagonal)
- Analytes
- Sampler ID.

Labels on glass containers will be secured with adhesive tape.

Field Notes

When visiting the sampling station, field personnel will record the following information on field forms that are maintained in a waterproof field notebook.

- Date
- Time of sample collection or visit
- Name(s) of sampling personnel
- Weather conditions
- Number and type of samples collected
- Field measurements
- Log of photographs taken
- Deviations from sampling procedures
- Unusual conditions (e.g., water color or turbidity, presence of oil sheen, odors, and land disturbances).

For onsite catch basin samples, the following additional information will be recorded on the field form and field notebook:

- Map showing location of catch basin on the property
- Date site was inspected by Duwamish source control team
- Date the catch basin was last cleaned.

Upon return to the office, field notes will be copied and reviewed by the QA officer. Copies of field notes will be included in the final report.

Sample Transport and Custody

All samples will be transported on ice at 4°C in a cooler to the analytical laboratory. Samples will be hand delivered to the lab and stored in a refrigerator at 4°C. A chain-of-custody record will accompany the samples (see Appendix C). Upon return to the office, the QA officer will review a copy of the signed chain-of-custody record.

Field Duplicates

Field duplicates will be collected for each type of sediment sample at a minimum frequency of 5 percent (see Table 3). If sufficient sample volume exists, field duplicates will be collected for all sediment samples and archived (frozen) for future analysis if necessary.

Equipment Decontamination

All sampling equipment, including the sample bottles, Isco pump tubing, teflon suction tubing, and stainless-steel materials will be decontaminated prior to each sampling event. The following decontamination procedures will be followed after every sampling event:

Sediment Trap Sample Bottles

- Phosphate-free detergent wash and tap water rinse
- 10 percent ultra-pure hydrochloric acid rinse
- Reagent-grade water rinse
- Ultra-pure methanol rinse
- Air dry
- Cap on during transport to site.

Stainless-Steel Scoop and Mixing Bowl

- Phosphate-free detergent wash and tap water rinse
- Reagent-grade water rinse
- Ultra-pure methanol rinse
- Air dry
- Wrapped in new aluminum foil and bagged in plastic.

After the decontamination procedures have been completed, the sampling equipment will be capped or sealed with new aluminum foil and the sampling device will be protected and kept clean.

Laboratory Procedures

All samples will be analyzed by Analytical Resources, Inc. (ARI) with the exception that sediment grain size will be analyzed by Am Test Laboratories and low-level mercury in water will be analyzed by Brooks Rand, Ltd. ARI is certified by Ecology to perform the analyses listed in Table 4 and the methods used have been approved by EPA. The following quality control samples will be analyzed with each sample batch:

- Method blanks
- Laboratory duplicates (conventionals and metals only)
- Field duplicates
- Matrix spikes
- Matrix spike duplicates (organics only)
- Control standards
- Standard reference materials
- Surrogate spikes (organics only).

Sediment Trap Processing

Sediment trap samples will be delivered to the lab in the teflon field sampling containers. The lab will process the samples as follows prior to chemical analysis:

- Overlying water manually decanted, centrifuged, and saved for rinsing
- Sediment in field container transferred to appropriate containers
- Sediment remaining in field container rinsed with decant water and centrifuged.

Data Quality Assessment

The laboratories will report the analytical results within 30 days of receipt of the samples. Data will be checked for errors or omissions by the laboratory and the SPU QA officer. Sample and quality control data will be reported in a standard format. The laboratory reports will also include a case narrative that describes laboratory quality assurance results, any problems encountered in the analyses, and applicable data qualifiers.

The analytical results will be assessed by the laboratory and the QA officer in accordance with criteria described in the data quality objective section. Problems identified during these data assessments or through field and laboratory auditing will be addressed with corrective actions. Laboratory data will be checked for compliance with specified methods, holding times, reporting limits, and quality control criteria.

Implementing the QA procedures as described in previous sections will allow early detection of field data collection or laboratory analysis problems. Should problems arise, the project manager will be notified as to the nature and extent of the problem. A corrective action plan will be outlined to eliminate the problem. Once implemented, the effectiveness of the corrective action will be evaluated. Data problems, procedural problems, a description of the corrective action, and an evaluation of the effectiveness of the corrective action will be documented in the QA reports.

Data quality assessment procedures are described separately below for each quality control element.

Method Blanks

Method blanks, which are comprised of reagent-grade water, will be analyzed and the results will be presented in each laboratory report. Sample values less than 5 times a detected blank value will be considered estimates and flagged with a (B) qualifier.

Laboratory and Field Duplicates

Precision of laboratory duplicate and matrix spike duplicate results will be presented in each laboratory report and checked by the QA officer. Data for batch samples will be acceptable providing duplicates of project samples are analyzed at a frequency of at least 5 percent. Precision of laboratory, matrix spike, and field duplicate results will be calculated according to the following equation:

$$RPD = \frac{100(C_1 - C_2)}{(C_1 + C_2)/2}$$

Where:

RPD = Relative standard deviation
C_1 = Larger of 2 values
C_2 = Smaller of 2 values

Laboratory and matrix spike duplicate results exceeding the precision objectives in Table 5 will be noted and flagged as estimates (J). If the objectives are severely exceeded (i.e., more than twice the objective), the associated values will be rejected (R). Field duplicate results will be used to evaluate both analytical precision and environmental variability, and may be used to flag data at the discretion of the QA officer.

Matrix and Surrogate Spikes

Matrix spike results will be presented in the laboratory report and checked by the QA officer. Data for batch samples will be acceptable providing spikes of project samples are analyzed at a frequency of at least 5 percent. Accuracy of matrix spikes will be calculated according to the following equation:

$$\%R = \frac{100(S - U)}{C_{sa}}$$

Where:

%R = Percent recovery
S = Measured concentration in spike sample
U = Measured concentration in unspiked sample
C_{sa} = Actual concentration of spike added.

If the analyte is not detected in the unspiked sample, then a value of zero will be used in the equation. The laboratory also analyzes surrogate spikes, and will include the results and control limits of these analyses in the laboratory reports.

Results exceeding the accuracy objectives in Table 5 will be noted and associated values will be flagged as estimates (J). However, if the matrix spike recovery exceeds 125 percent and a sample value is less than the reporting limit, the result will not be flagged as an estimate. Undetected values will be rejected if the percent recovery is less than 30 percent.

Control Standards

The accuracy of control standards will be reported in each laboratory report and checked by the QA officer. Accuracy for control standards will be calculated according to the following equation:

$$\%R = \frac{100(M - T)}{T}$$

Where:

%R = Percent recovery
M = Measured value
T = True value.

Results exceeding the accuracy objectives in Table 5 will be noted and associated values will be flagged as estimates (J). If the objectives are severely exceeded (e.g., more than twice the objective), then associated values will be rejected (R) and the analytical laboratory will be requested to reanalyze the samples.

Standard Reference Materials

Standard reference materials (SRM) are materials whose values are certified by a technically valid procedure and are accompanied by (or traceable to) a certificate or other documentation that is issued by a certifying body (e.g., National Institute of Standards and Technology [NIST]). The analytical laboratory will use NIST certified standard reference materials for sediment parameters and NIST traceable standards for water parameters. For sediments, the SRM used for PCBs and SVOCs is SQ-1 (Sequim Bay 1), for metals is ERA D034-540 (Trace Metals in Soil), and for TOC is NIST 8704. The SRM for water analyses is a NIST traceable standard. Results of the SRM analyses will be compared to action limits specified by the supplier to validate the accuracy of the analysis.

Completeness

Completeness will be assessed by comparing valid sample data that meet the data quality objectives and the chain-of-custody records. Completeness will be calculated by dividing the number of valid values by the total number of values. Samples will be reanalyzed or recollected if completeness is less than 95 percent.

Data Management and Reporting

All data collected as part of this project will be maintained on file by SPU. Copies of field notes, Isco sampler reports, and completed chain-of-custody forms will be submitted to the QA officer following each sampling event. The QA officer will review the field information to evaluate the following:

- Field notes to identify any unusual field conditions and/or deviations from the sampling protocol.
- Valid chain-of-custody documentation.

The analytical laboratories will submit a complete data package documenting the sampling results within 30 days of the date that samples were submitted to the laboratory. The data package will include the following:

- Sample results and explanation of data qualifiers.
- Results for all quality control analyses, including laboratory control standards, duplicates, matrix spikes/matrix spike duplicates, laboratory blanks, and surrogate recoveries (for organic analyses).
- Case narrative describing any analytical problems and corrective actions taken.

The QA officer will review the data package to determine whether data quality objectives were met. Deficiencies will be immediately reported to the analytical laboratory.

All sample results, including data qualifiers, sampling conditions, and field measurements will be entered into Excel spreadsheets.

A project report will be prepared that will present the laboratory reports, QA worksheets, chain-of-custody forms, copies of field notes, data analysis, and any problems and corrective actions taken. Sample results will be presented in tabular form, and will also be marked on a sample location map. Summary statistics of stormwater samples will be presented for both storm and base flow events, and will include:

- Number of samples analyzed
- Number of samples with detected chemical concentrations
- Arithmetic mean
- Median
- Minimum and maximum

- 10^{th} and 90^{th} percentiles
- 95 percent upper and lower confidence limits of the arithmetic mean and the median
- Standard deviation of the arithmetic mean
- Percent coefficient of variation.

For samples reporting non-detected concentrations, one-half the reporting limit will be used to calculate the summary statistics. Sediment sample results will be compared to sediment quality standards for marine sediments (WAC 173-204) because of the proximity of the outfall to the Duwamish Waterway, which is classified as a marine water body. Results for the organic parameters (PCBs and semivolatiles) will be normalized to organic carbon prior to comparisons with the sediment standards and historical data.

Catch basin sediment sample results will be compared to sediment criteria to evaluate areas that exceed sediment quality standards. Results will also be compared within catch basin areas to focus source control efforts. Both comparisons will help prioritize areas for agency business inspections.

In-line sediment and sediment trap sample results will be compared to each other to assess the variability of contamination between the different size fractions of sediment in the drainage system. In-line sediments will include large particle sizes (i.e., sands and gravels) while the sediment trap samples will be comprised of only finer sediment particles (i.e., clays and silts). Metals and organics tend to adsorb more readily to finer sediment particles than to larger particles due to the greater amount of charged surface area that exists on clay and silt particles.

In-line sediment and sediment trap data collected in subsequent years will be compared separately to the current results to evaluate the effectiveness of pollutant source control actions in the Diagonal basin. Non-parametric trend analysis will be used to determine if the levels of contamination are significantly different. In-line sediment data will also be compared to historical storm drain sediment data (Tetra Tech 2002).

References

Ecology. 1996. Stormwater Sediment Trap Pilot Study. Publication No. 96-347. Washington Department of Ecology, Olympia, Washington.

Ecology. 2001. Guidelines and Specifications for Preparing Quality Assurance Project Plans. Publication No. 01-03-003. Washington Department of Ecology, Olympia, Washington.

EPA. 1983. Methods for chemical analysis of water and wastes. EPA-600/4-79-020. U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.

EPA. 1994. Determination of Trace Elements in Water and Wastes by Inductively Coupled Plasma-Mass Spectrometry, Method 200.8. EPA/600/R-94/111. U.S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.

EPA. 1995. Test Methods for Evaluating Solid Waste, SW-846, 3rd edition. U. S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington D.C.

EPA. 1996. Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels-Method 1669. U.S. Environmental Protection Agency, Office of Water, Washington, D.C.

EPA. 2002a. Method 1631, Revision E: Mercury in Water by Oxidation, and Cold Vapor Atomic Fluorescence Spectrometry. EPA-821-R-02-019. U.S. Environmental Protection Agency, Office of Water, Washington D.C. August 2002

EPA. 2002b. National Recommended Water Quality Criteria: 2002. EPA-882-R-02-047. U.S. Environmental Protection Agency, Office of Water, Washington D.C. November 2002.

Herrera. 1998. Lake Union Area Source Control – Stormwater Characterization and Treatment Options. Prepared for Seattle Public Utilities by Herrera Environmental Consultants, Inc., Seattle, Washington.

King County. 1995. Unpublished stormwater quality analysis data from two locations in the Diagonal Ave S. storm drain system, provided to Herrera Environmental Consultants by Beth Schmoyer, Seattle Public Utilities.

King County Department of Natural Resources, Anchor Environmental, LLC, and EcoChem, Inc. 2001. Duwamish/Diagonal CSO/SD Cleanup Study Report – Elliott Bay/Duwamish Restoration Program. Prepared for the Elliott Bay/Duwamish Restoration Program Panel. Seattle, Washington.

Puget Sound Estuary Program. 1996. Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound. Prepared for the U. S. Environmental Protection Agency, Seattle, Washington.

Tetra Tech. 2002. Technical Report – Diagonal Drain Cleaning Preparation Task 3 Report: Sediment Characterization. Prepared for Seattle Public Utilities, Seattle, Washington.

WAC 173-201a. November 18, 1997. Water Quality Standards for Surface Waters of the State of Washington. Washington Administrative Code.

WAC 173-204. December 29, 1995. Sediment Management Standards. Washington Administrative Code.

Appendix A

Appendix B

VERNON ENVIRONMENTAL, INC.

3949 Klahanie Drive SE, #9202, Issaquah, Washington *P/C/F 206.686.2469*

Catch Basin Sediment Data Quality Objective Plan (Split Sampling Between Rainier Commons, Seattle Public Utility and King County)

Former Rainier Brewery Property
3100 Airport Way South
Seattle, Washington
King County

Prepared for:

Rainier Commons, LLC
c/o Ariel Development, LLC
Eitan Alon
3100 Airport Way South
Seattle, WA 98134

Prepared by:

Vernon Environmental, Inc.
3524 255th Lane SE, Suite 3
Issaquah, Washington 98029

January 3, 2008

Table of Contents

Catch Basin Sediment Data Quality Objectives (Split Sampling Between Rainier Commons, Seattle Public Utility and King County)

Former Rainier Brewery Property

1.0 Site Description and Conceptual Site Model Development

The former Rainier Brewery property is an approximate 4.57-acre parcel located at 3100, Airport Way South, Seattle, WA (the, "Site"). The Site is bound between South Stevens Street to the north, by South Horton Street to the south, by Interstate-5 to the east and Airport Way South to the west. Rainier Commons, LLC (the, "Rainier") owns the Site, which is operated by Ariel Development, Inc. (the, "Ariel"). One-third of the Site is leased to Tully's Coffee. Tully's roasts, grinds, packages, distributes coffee and operates its corporate headquarters on the premises.

The Site was initially developed in the late 1800s as a brewery and functioned in a similar capacity until 1996. The Site has been owned by several entities since its initial development. Separate phases of Site redevelopment has occurred throughout its history. The Site is currently being redeveloped into community mixed use, including but not limited to, residential, commercial and retail space.

Farallon Consulting, Inc. (the, "Farallon") conducted a Phase I Environmental Site Assessment on April 14, 2004. Farallon reported, from their Site reconnaissance, nine (9) pad-mounted electrical transformers at various locations throughout the Site. Farallon also observed oil staining at floor drains adjacent to transformer vaults within several of the buildings and adjacent to abandoned equipment. They did not identify the transformer locations and associated vaults as a Recognized Environmental Condition. Ariel states all of the existing onsite transformers are non-PCB containing.

Suspected and confirmed chemical(s)-of-concern include polychlorinated biphenyls (the, "PCBs") in catch basin sediments. The above suspected chemical(s)-of-concern are formed on the basis of an October 12, 2005 City of Seattle Public Utilities Department (the, "SPU") stormwater pollution prevention inspection at the Site. Preliminary analytical data from the sediment sampling event showed concentrations of PCBs (up to 2,200 mg/kg) in the sediment collected from the following locations: the breezeway trench drain, the catch basins in the tank farm area, and two catch basins in the southwest parking lot adjacent to the building and north of the loading dock.

SPU sampled six (6) sediment sample points for the presence of PCBs at locations discussed above. The analytical results from each location are BNSF CB1-17 mg/kg, BNSF CB2-23 mg/kg, CB 14-175 mg/kg, CB 8-1,340 mg/kg, composite of CB1 through CB6-19.8 mg/kg and CB12-2,200 mg/kg (Figure 1).

On October 4, 2007 KC's Bruce Tiffany and Arnaud Girard, SPU's Beth Schmoyer, VEI's Conrad Vernon, and Rainer Commons' Eitan Alon and John Jack met to discuss potential catch basin sediment containing polychlorinated biphenyl (the, "PCB") that may potentially be discharged from the Site to the Duwamish waterway and wastewater treatment facility located at the Magnolia, Washington treatment facility via KC and SPU storm drains and combined sewer overflows.

VEI compared past SPU PCB analytical results from its October 12, 2005 stormwater pollution prevention catch basin inspection and VEI's catch basin analytical results collected in June 2006 at the Site. VEI showed the concentrations of PCB analytical results, found in the Site catch basin sediments, had decreased from SPU's highest sample concentration of 2,200 mg/kg located in catch basin CB 12 to VEI's CB 12 sediment PCB sample result concentration of non-detect (at a Method Reporting Limit of 0.20 mg/kg) by Advanced Analytical laboratory located in Redmond, WA. SPU and VEI catch basin analytical result trends are presented below.

SPU October 2005 Rainier Commons Catch Basin Sediment Analytical Results (PCB A1254)	**VEI June 2006 Rainier Commons Catch Basin Sediment Analytical Results (PCB A1254)**
BNSF CB-1: 17 mg/kg	BNSF CB-1: 4.3 mg/kg
BNSF CB-2: 23 mg/kg	BNSF CB-2: Non-Detect (ND)
CB-14: 175 mg/kg	CB-14: 0.51 mg/kg
CB-8: 1,340	CB-8: 3.2 mg/kg
CB-1 through CB-6 (composite): 19.8 mg/kg	CB-1: 0.54 mg/kg; CB-2 through CB-6: ND
CB-12: 2,200 mg/kg	CB-12: ND

In an effort to determine whether the PCB source was a result of paint chips released from the facility during painting operations, VEI also collected a paint chip sample. The sample analytical result showed the paint contains 2,300 mg/kg PCB A1254. Based on the paint sample analytical result compared to SPU's catch basin sediment highest PCB analytical result of 2,200 mg/kg, it is highly feasible the paint chips are the source of catch basin sediment impact that may be a result of paint chips migrating from paint chip removal activities to the catch basins during surface run-off precipitation events. Remaining PCB paint on the exterior of the building has been encapsulated through the application of new paint. Moreover, Rainier Commons implemented its PCB Paint O&M Plan in its effort to prevent any future release.

It is Rainier Commons' position that the paint chips are no longer present above regulatory concentration limits in the Site catch basin sediments as the analytical trends show over time. It is Rainier Commons' understanding that KC and SPU are identifying immediately adjacent and hydraulically down gradient catch basin sample locations to the Site. Further, KC and SPU will sample the sediments and storm/wastewater of those identified locations and provide sufficient notice (preferably 10-business days) to VEI before KC's and SPU's sampling event so VEI may be present during split sampling activities, chain of custody and transportation to the selected analytical laboratory(s). Prior to the sampling event VEI requested a copy of KC's and SPU's Field Sampling

Plan and/or any other field work plan, i.e., QA/QC Plan, SOPs, so it can incorporate them into VEI's field work plans for split sampling.

Although an asphalt/concrete cap and building foundations currently cover the Site and the target analytes are contained in the underground stormwater system, human and ecological receptors are potentially at risk through direct sediment contact, ingestion and inhalation (fugitive air emission) pathways. A Stormwater pathway for direct contact, inhalation and ingestion with human and ecological receptors is possible due to physical/chemical transport mechanisms. No documented drinking water wells are on-Site or within the surrounding area. Down-gradient surface water bodies are located at a sufficient distance to possibly be affected by stormwater discharge. Potential receiving surface water includes the Duwamish River (approximately 1.0 mile from the Site) and the Harbor Island East Waterway (approximately .75 miles away from the Site). No reported stormwater discharge to either surface water body from the Site has been documented. Surrounding stormwater system soils near pipe joints connecting to the catch basins may be affected from passive sediment release. Onsite surface water carrying affected sediments after a precipitation event may present a pathway for receptor exposure as well.

The Site is situated above Puget Sound's Vashon till stratum. The regional sediments consist primarily of interlayered and/or sequential deposits of alluvial clays, silts and sands. In the major river valleys of the Puget Sound Region, alluvial deposits lie in and along present streams. The sediments consist of unconsolidated, stratified, clay, silt, and very fine-to-fine sand, and typically contain considerable organic matter.

In May 2003 Farallon Consulting conducted a limited subsurface investigation. The subsurface conditions consisted of gravel from the ground surface to a minimum depth of one (1) to two (2)-feet below ground surface, overlying poorly-sorted silt, sand and gravel, and interbedded sandy silt and silty sand to the maximum depth explored of fifteen (15)-feet below ground surface.

The following bulleted text presents site hydrogeology findings from the Limited Subsurface Investigation conducted by Farallon Consulting, LLC (the, "Farallon") dated May 2003 and Farallon's Phase I Environmental Site Assessment dated April 2004.

- Site soils consist of sand and silt layers with varying amounts of gravel,
- Groundwater is encountered at 8-11 feet below ground surface,
- Groundwater direction is thought to flow to the northwest (however, seasonal conditions affect the flow direction, which has been reported to flow to the north and northeast; URS 2002), and
- Average hydraulic gradient is thought to be low.

Potential off-site chemical-of-concern migration to surface water bodies is unlikely to present a risk via *groundwater* transport due to reported silt and sand soil types of the site and surrounding area, the reported hydraulic conductivity for the area, the geochemical/physical interaction of the chemical(s)-of-concern and surrounding soils, and the down-gradient distance to potential receiving surface water (approximately 1-

mile from Duwamish River and approximately .75 miles away from the Harbor Island East Waterway).

Potential off-site chemical-of-concern migration to surface water bodies (Lower Duwamish River) may be possible via surface water run off to onsite catch basins and then through sewer, combined sewer/storm water and storm water systems.

2.0 Data Quality Objective (DQO) Development

2.1 Site Impact Summary

According to the SPU's stormwater pollution prevention inspection at the Site, PCBs were identified in catch basin sediments. The Field Sampling Plan presents the SPU proposed sample locations.

SPU sampled six (6) sediment sample points for the presence of PCBs at locations discussed above during October 2005. The analytical results from each location are BNSF CB1-17 mg/kg, BNSF CB2-23 mg/kg, CB 14-175 mg/kg, CB 8-1,340 mg/kg, composite of CB1 through CB6-19.8 mg/kg and CB12-2,200 mg/kg (Figure 1).

Rainier Commons June 2006 catch basin sampling event showed reduced PCB concentrations as follows.

SPU October 2005 Rainier Commons Catch Basin Sediment Analytical Results (PCB A1254)	**VEI June 2006 Rainier Commons Catch Basin Sediment Analytical Results (PCB A1254)**
BNSF CB-1: 17 mg/kg	BNSF CB-1: 4.3 mg/kg
BNSF CB-2: 23 mg/kg	BNSF CB-2: Non-Detect (ND)
CB-14: 175 mg/kg	CB-14: 0.51 mg/kg
CB-8: 1,340	CB-8: 3.2 mg/kg
CB-1 through CB-6 (composite): 19.8 mg/kg	CB-1: 0.54 mg/kg; CB-2 through CB-6: ND
CB-12: 2,200 mg/kg	CB-12: ND

Sediment samples will be collected and analyzed from each of three (3) catch basin locations during this sampling event as grab/composite sediment samples and sediment in-line sampling methodology as described in the SPU Sampling and Analysis Plan (SAP) (Field Sampling Plan).

During the anticipated field work, sediment grab/composite samples will be collected at each identified catch basin end of pipe stream. Samples will be collected at different times as the lines are jetted by SPU. The grab/composite samples will be mixed and collected into a single homogeneous composite sample. Figure 1 of the Field Sampling Plan shows the proposed sediment grab/composite sample locations. Selection of these locations assumes the sediment grab/composite sample locations cover the impacted area(s) of the Site

underground stormwater utilities and the samples are at locations hydraulically down-gradient in the drainage system and will therefore, be representative of Site hydraulically up-gradient underground utility conditions.

Composite sediment samples will be collected and analyzed from each location during this sampling event. Sediments from the sample locations will be analyzed for the following constituent(s):

SAMPLE DESIGNATION

Collected Analytical Samples

Rainier Commons, LLC - Ariel Development — Sample Date: Week of 1/7/08
Former Rainier Brewery Property
3100 Airport Way South, Seattle, WA

Matrix	Parameters	Method	TAT (days)	Number of Samples per Location
Catch Basin Sediments	PCBs	EPA 8082	10	1*
Duplicate	PCBs	EPA 8082	10	*

**Each sample location will consist of 1-sample collected as a grab composite sediment sample from a five- (5) point matrix (1-center and 4-corners of each catch basin).*
**One (1) Field Blank sample to be collected*
**One (1)Triplicate samples to be collected*
**One (1) Trip Blank sample*

The Analytical result turn around time is expected to be ten (10) days regarding the aforementioned target analytes. Data reduction, validation and reporting is expected to take an additional three (3) days.

The members of the scoping team will include the Site Assessment Manager (SAM), a field-sampling expert, a chemist, a hydrogeologist, a quality assurance officer and a data validator. The Site Assessment Manager is the decision-maker.

The main elements of the Former Rainier Brewery project area conceptual site model (Figure 1) include the source of contamination (affected media, i.e. sediments), routes of migration, potential receptors, and the type of expected contaminants.

Exposure from on-site sediment/soil chemical-of-concern releases to surface water and air pathways (fugitive dust) is possible. Potential human and ecological receptors may be at risk. Furthermore, receptors may be exposed to contaminants through dermal contact, inhalation and ingestion of sediments/soils. As previously discussed, groundwater contact is unlikely at this site.

The Washington State Department of Ecology's (Ecology) Model Toxic Control Act (MTCA) provides direction regarding the minimum samples necessary that would still provide adequate data quality to support a defensible decision (MTCA), as well as Guidance promulgated under federal statutes 40 CFR 761. There are adequate resources to collect and analyze the envisioned number of samples from the sediment sample locations.

No strict public or regulatory timeframe has been established to complete the sampling event and cleanup of the Site. Ariel's, Ecology's and SPU's corrective action urgency drives project time constraints. The Rainier Commons, LLC has the financial resources to complete the investigation and cleanup, but is motivated to control costs through this investigation (eliminating unnecessary analyte laboratory costs for potential future sediment, soil and groundwater analysis, and future remediation costs).

2.2 Decision Identification

A known release of PCBs in the catch basin sediments of the stormwater system has occurred on the Site from years of business operating activities. This investigation will provide quantitative results concerning analyte types and concentrations; extent of contamination and it will determine which media is affected. Analytical results from this investigation will define future assessment activities and remedial action.

2.3 Decision Inputs

Information needed to resolve future inputs for Site investigation and remedial action decision making include sediment analysis from the identified sampling locations. Potential future sample collection and remedial action will be based on the aforementioned results.

Informational input sources include analytical measurements as identified in the Sampling and Quality Assurance/Quality Control (QA/QC) Plans, the SPU stormwater pollution prevention inspection findings report and previous Rainier Commons' investigation(s).

Contaminant action levels are defined in Ecology's MTCA for soils under Method A cleanup standards (WAC 173-340). Sampling assurance and control

techniques are identified in the QA/QC Plan. The QA/QC Plan ensures that the Field Sampling Plan collection results are of the highest quality and are within control parameters. Analytical methods are referenced and presented in Table 1, as well as, the associated laboratory data quality and control objectives. Sampling techniques will follow prescribed EPA Method standard operating procedures (reference Field Sampling Plan).

2.4 Site Boundaries

The investigation domain will focus on SPU identified hydraulicallydown gradient Site catch basin sediments from the Site underground storm water utility piping. Analytical types identified in Section 1 and the locations of the catch basins are assumed to be representative of Site sediment conditions. Sample results from this location will be used to make decisions on potential future investigations and remedial action.

The temporal boundaries include the timeframe within the investigation for which the samples must be collected. Since the study is intended to determine health risks, all sample data will be collected immediately in an effort to provide congruent seasonal data results for future data comparison purposes. Potential future quarterly catch basin sediment sample collection will be conducted under season specific weather conditions. *It is assumed the stormwater system has been contaminated for several years; however, it is expected chemical-of-concern concentrations have dissipated, but will not increase, over the course of this study. Practical constraints associated with collecting catch basin end of pipe grab/composite sampling associated with line jetting operations are expected while sampling.*

SPU will collect decanted vactor truck sediment samples from the SPU identified sample locations post line jetting. Collection of vactor truck samples is a deviation from the SPU sampling plan (attached). SPU has stated the vactor truck will be pressure washed prior to each sample location. Pressure washing does not guarantee the vactor truck is free from previous contamination (residual contamination elimination is not possible to confirm), nor its associated pipes, hoses and other affected equipment. Rainier Commons will conduct split sample collection and analysis from the SPU vactor truck sediments in addition to in-line and end of pipe sediments prior to vactor truck collection. The sample results from the vactor truck sediments will be flagged as not representative of Site conditions and will therefore be eliminated from further consideration by Rainier Commons.

2.5 Decision Rule Development

This investigation is implemented to determine whether downgradient chemical-of-concern types and their respective concentrations are present in the

stormwater system. The Site Assessment Manager (SAM), in consultation with Rainer Commons, LLC warrant holders, Ecology and the SPU, has decided to include the aforementioned target compound for inclusion into this study based on what they believe can be reasonably expected from past operations and sampling events. Hydrogeologic data concerning conductivity, permisivity and other parameters will not be collected. Therefore the SAM cannot reasonably ascertain the migration potential of contaminants from catch basin sediments to soil to groundwater and potential transportation off-site. The SAM will reasonably ascertain whether PCB migration from the stormwater system is possible.

The action levels for the site contaminants will be determined by Ecology's MTCA Method A standards.

If any contaminants are found to be present below or above Ecology's MTCA Method A cleanup standards, then there is actual contamination in the sediments. The goal of this sampling is to characterize the levels of PCBs in all of the catch basins and manholes. The concentrations will dictate how the solids must be handled and where they may be disposed. Once the solids have been removed from the catch basins, the lines have been jetted, and the solids disposed, samples must be collected in the future to determine if the lines are being re-contaminated.

2.6 Decision Error Limits

The scoping team has estimated the range for the parameter of interest regarding target compound concentrations to be zero to any concentration above prescribed laboratory EPA method detection limits in the sediments. Any "hit" will require same compound sample collection and analysis at future collection points in the sediments. Three (3) types of decision errors are defined in the following text. The decision error with the most severe consequences is also established below.

Decision error (a) is defined as the analytical results showing a chemical-of-concern that is present in the initial location, but will not be present in any future sediment locations. The consequences of this decision error include the unnecessary costs of additional chemical analysis.

Decision error (b) is defined as; the analytical data present results that are above the MTCA Method A standard when it is not. Again, this error consequence can lead to costly future investigation and remedial action. Treating sediments can be lengthy and costly. A positive consequence of taking unnecessary action is that some environmental improvement may occur by removing very low levels of contaminants even though the improvement may be of little value when compared to the costs.

Decision error (c) is defined as; the opposite of decision errors (a) and (b). Some consequences of this decision error can result in environmental damage; increase future health costs, increased cancer illness and deaths. A positive consequence of this decision error is that resources are conserved. While the resource savings may be of small consequence when weighed against the negative consequences, it is important to consider them here. A complete, balanced picture of the problem can only be developed if both the positive and negative consequences of the decision error are considered. Decision error (c) is the more severe decision error.

Defining the true state of nature for each decision error will be determined upon closer investigation and maintaining acceptable QA/QC parameters. Also, sample population size must be representative of Site conditions. The true state of nature for the more severe decision error will be considered the baseline condition (null hypothesis) and the true nature for the less severe decision error will be the alternative hypothesis.

- Null hypothesis, H_o = The analytical results show that an analyte is not present at this initial location and that the analytical results show concentrations below the MTCA Method A

- Alternative hypothesis, H_a = The analytical results show that an analyte is present and the concentration of analytes are above the MTCA Method A

False positive error equals decision error (a) & (b) and a false negative error equals decision error (c).

2.7 Design Optimization

The SAM (decision-maker) will analyze existing and new data to select the lowest cost sampling design that is expected to meet the DQOs. Existing data from previous investigations is useful in determining contaminant classes and expected concentrations. New data will be generated to determine impact extent and media contamination. A tolerance interval of 95% will be used to make this determination. Sediment sampling may be required in the future with at least three (3) additional sampling events in an effort to determine that there is a 95% probability of identifying residual chemical(s)-of-concern concentrations in the catch basin sediments. In the alternative, sediment analytical results may be considered 95% probable based on the scoping team's knowledge of past practices on the site.

Figures and Tables

TABLE 1

ANALYTICAL METHODS AND QC GUIDELINES

Sampling Guide

Analysis	SpecificMethod	Container	Preservation	Hold (days)	Amount Needed
Polychlorinated Biphenyls by EPA Method 8082 in Soil					
8082 PCB Only	EPA 8082	Glass jar w/PTFE seal	Store cool at 4°C	14	250 grams
Polychlorinated Biphenyls by EPA Method 8082 in Wipe					
8082 PCB Only	EPA 8082	Glass jar w/PTFE seal	Store sealed at STP	14	one wipe in Hexane

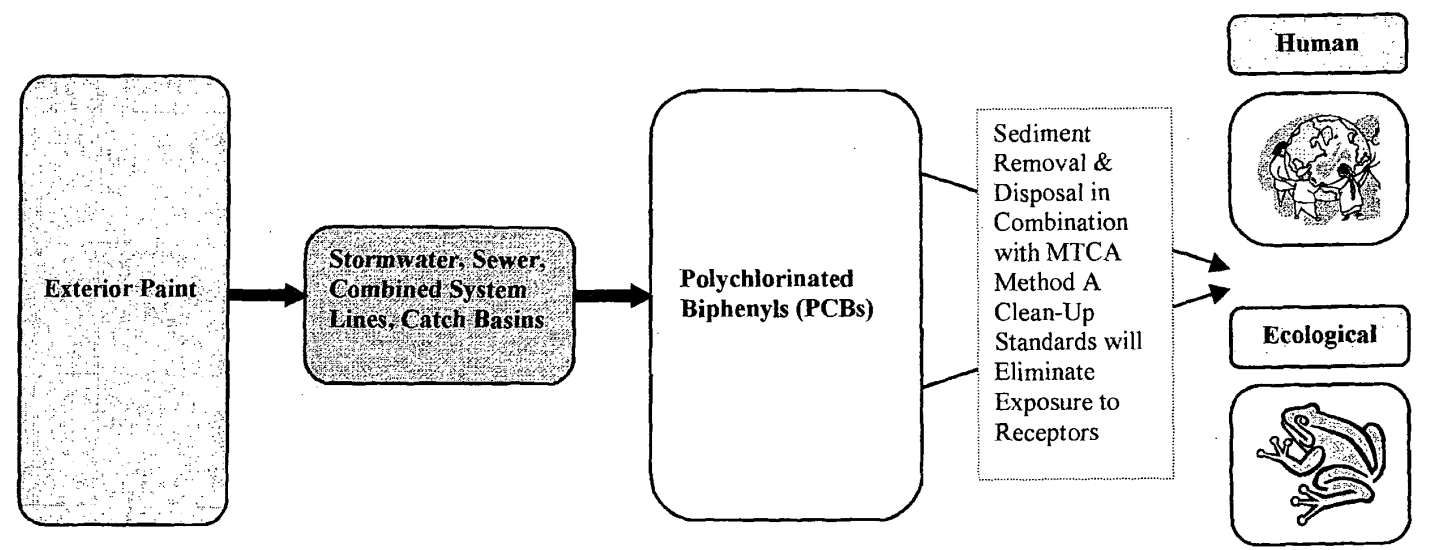
Analytical Method Details

Method	Analyte	MDL	MRL	Units	Surr. %R	DUP RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike %R	Blank Spike RPD	CAS #
Polychlorinated Biphenyls by EPA Method 8082 in Soil											
EPA 8082	Aroclor 1016	2.66	25.0	ug/kg dry wt	-	-	47-134	35	54-125	30	12674-11-2
EPA 8082	Aroclor 1016 [2C]	2.66	25.0	ug/kg dry wt	-	-	47-134	35	54-125	30	12674-11-2
EPA 8082	Aroclor 1221	13.3	50.0	ug/kg dry wt	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1221 [2C]	13.3	50.0	ug/kg dry wt	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1232	5.76	25.0	ug/kg dry wt	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1232 [2C]	5.76	25.0	ug/kg dry wt	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1242	2.08	25.0	ug/kg dry wt	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1242 [2C]	2.08	25.0	ug/kg dry wt	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1248	1.78	25.0	ug/kg dry wt	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1248 [2C]	1.78	25.0	ug/kg dry wt	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1254	1.49	25.0	ug/kg dry wt	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1254 [2C]	1.49	25.0	ug/kg dry wt	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1260	3.80	25.0	ug/kg dry wt	-	-	22-171	35	58-128	30	11096-82-5
EPA 8082	Aroclor 1260 [2C]	3.80	25.0	ug/kg dry wt	-	-	22-171	35	58-128	30	11096-82-5
EPA 8082	Aroclor 1262	1.46	25.0	ug/kg dry wt	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1262 [2C]	1.46	25.0	ug/kg dry wt	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1268	6.20	25.0	ug/kg dry wt	-	-	-	-	-	-	11100-14-4
EPA 8082	Aroclor 1268 [2C]	6.20	25.0	ug/kg dry wt	-	-	-	-	-	-	11100-14-4
EPA 8082	TCX			Surrogate	39-139	-	-	-	-	-	877-09-8
EPA 8082	TCX [2C]			Surrogate	39-139	-	-	-	-	-	877-09-8
EPA 8082	Decachlorobiphenyl			Surrogate	33-163	-	-	-	-	-	2051-24-3
EPA 8082	Decachlorobiphenyl [2C]			Surrogate	33-163	-	-	-	-	-	2051-24-3

Polychlorinated Biphenyls by EPA Method 8082 in Wipe										
EPA 8082	Aroclor 1016	0.500	2.00 ug/Wipe	-	-	70-130	25	70-130	25	12674-11-2
EPA 8082	Aroclor 1016 [2C]	0.500	2.00 ug/Wipe	-	-	70-130	25	70-130	25	12674-11-2
EPA 8082	Aroclor 1221	0.500	2.00 ug/Wipe	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1221 [2C]	0.500	2.00 ug/Wipe	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1232	0.500	2.00 ug/Wipe	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1232 [2C]	0.500	2.00 ug/Wipe	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1242	0.500	2.00 ug/Wipe	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1242 [2C]	0.500	2.00 ug/Wipe	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1248	0.500	2.00 ug/Wipe	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1248 [2C]	0.500	2.00 ug/Wipe	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1254	0.500	2.00 ug/Wipe	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1254 [2C]	0.500	2.00 ug/Wipe	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1260	0.500	2.00 ug/Wipe	-	-	52-140	25	52-140	25	11096-82-5
EPA 8082	Aroclor 1260 [2C]	0.500	2.00 ug/Wipe	-	-	52-140	25	52-140	25	11096-82-5
EPA 8082	Aroclor 1262	0.500	2.00 ug/Wipe	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1262 [2C]	0.500	2.00 ug/Wipe	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1268	0.500	2.00 ug/Wipe	-	-	-	-	-	-	11100-14-4
EPA 8082	Aroclor 1268 [2C]		ug/Wipe	-	-	-	-	-	-	11100-14-4
EPA 8082	TCX		Surrogate	40-130	-	-	-	-	-	877-09-8
EPA 8082	TCX [2C]		Surrogate	40-130	-	-	-	-	-	877-09-8
EPA 8082	Decachlorobiphenyl		Surrogate	40-130	-	-	-	-	-	2051-24-3
EPA 8082	Decachlorobiphenyl [2C]		Surrogate	40-130	-	-	-	-	-	2051-24-3

Conceptual Site Model

Figure 1



VERNON ENVIRONMENTAL, INC.

3524 255th Lane SE, Suite 3, Issaquah, WashingtonP/C/F 206.686.2469

Catch Basin Sediment Quality Assurance/Quality Control Plan (Split Sampling Between Rainier Commons, Seattle Public Utility and King County)

Former Rainier Brewery Property
3100 Airport Way South
Seattle, Washington
King County

Prepared for:

Rainier Commons, LLC
c/o **Ariel Development, LLC**
Eitan Alon
3100 Airport Way South
Seattle, WA 98134

Prepared by:

Vernon Environmental, Inc.
3524 255th Lane SE, Suite 3
Issaquah, Washington 98029

January 3, 2008

Table of Contents

Catch Basin Sediment Quality Assurance/Quality Control Plan (Split Sampling Between Rainier Commons, Seattle Public Utility and King County)

Former Rainier Brewery Property

1.0 Introduction

The purpose of the QA/QC Plan is to relate project objectives to specific measurements required to achieve those objectives. This Plan will provide sufficient detail to demonstrate the following:

- Intended measurements are appropriate for achieving project objectives
- Quality control procedures are sufficient for obtaining data of known and adequate quality
- Such data will be defensible if challenged technically or legally

This QA/QC Plan will support analytical results, which may be used to evaluate and select basic options required to draft a Corrective Action Plan and to assess unexplored areas on the site, which may lead to further investigation. The Field Sampling Plan contains many of the elements that are required in this QA/QC Plan. In an effort to prevent confusion for field technicians, chemists and reviewers please reference the Field Sampling Plan and Data Quality Objective Plan for the following QA/QC elements.

- The site background and environmental overview
- Statement of project objectives
- Sample collection design for critical and non-critical measurements
- Tabular summary for type and number of samples, sampling points, quality control and reserve sample collection and analysis
- Tabular summary of conventional chemistry parameters
- Sample collection schedule
- Applicable regulations

- Sampling site location, procedures, frequency, affected media and validity
- Analytical laboratory methods, e.g., EPA Standard Methods
- Quality control checks
- Required containers, holding times and preservation techniques

2.0 Project Organization and Responsibilities

Figure 1 presents the project's organizational chart. The Washington State Department of Ecology (Ecology) is responsible for the overall project. The Ecology Project Manager is Dan Cargill.

The Former Rainier Brewery Property is owned by Rainier Commons, LLC. Eitan Alon represents the LLC.

Conrad Vernon of Vernon Environmental, Inc. is an environmental consultant to the Project LLC and is responsible for project management. Technical and administrative elements are included in his project management responsibilities.

Conrad Vernon of Vernon Environmental, Inc. is the quality assurance manger for this project as well. He is responsible for writing and following through with the data quality objectives, sampling plan and QA/QC plan.

Kortland Orr of North Creek Analytical Laboratories is responsible for managing collected sample analyses. He is also responsible for sample preparation and ensuring the laboratory's QA/QC results are valid.

TBD of Vernon Environmental, Inc. is responsible for sample collection, preservation, holding times and transport. He is also responsible for field related QA/QC objectives, as well as, health and safety.

3.0 Quality Assurance Objectives

The following text presents the projects quantitative objectives. Quantitative objectives include analytical result precision, accuracy, method detection limits and completeness. Table 1 presents the quantitative objectives for this project.

Qualitative quality assurance objectives include data set comparability and representativeness. Comparability will be achieved by using consistent sample collection and analytical methods. Vernon Environmental is a reliable source for field related sample collection activities. North Creek Analytical is a reliable source for analytical method protocols. Representativeness will be achieved by collecting an adequate number

of unbiased samples. The data quality objectives attached to the sampling plan assist in making this determination.

Completeness will also be part of this plan. A ninety (90) percent goal has been established (90% of the total number of samples collected and analyzed will have results that pass data validation).

4.0 Sample Custody

Proper sample custody ensures that analytical results will not be compromised during transportation and storage. Records of everyone involved with handling the samples will be maintained so that a sample history can be reconstructed later, should the need arise. Please reference the Sampling Plan regarding how sample custody will be maintained and recorded from the field to the laboratory. Typical chain-of-custody reports, sample container labels, and custody seals will be used.

North Creek Analytical Laboratory is responsible for in-house chain-of-custody. Sample tracking will be recorded throughout laboratory locations for unpacking, extracting, and analysis. A paper trail will be provided to document intra laboratory chain-of-custody. Also, North Creek will document proper disposal of all samples.

5.0 Data Reduction, Validation and Reporting

Figure 2 shows the overall schematic of data flow. The schematic flow chart indicates the process for data handling, collection, transfer, storage, recovery and review for field and laboratory operations.

5.1 Data Reduction

Kortland Orr and Conrad Vernon will be responsible for data reduction. EPA and ASTM Standard Methods for data reduction procedures will be followed. Analytical results will be compared to QA/QC parameters for each analyzed chemical. Blanks will be included in determining analyte concentration, if the blank samples are above method detection limits, by subtracting the blank sample concentration from the field sample concentration. All soil data will be reported on a dry weight basis.

5.2 Data Validation

The data validator will review all analytical results and compare them to established QA/QC controls (reference the Field Sampling Plan). The validator will flag data outliers.

5.3 Data Reporting

The data validation subcontractor will be responsible for reporting analytical as well as QA/QC results. Conrad Vernon will prepare the data report with input from the field technician regarding hydrogeologic data, field notes, sample plan changes, and health and safety. Please reference the Field Sampling Plan for reviewing matrix, units of measurement, etc.

6.0 Calculation of Data Quality Indicators

Precision will be calculated from duplicate measurements relative percent difference (RPD).

$$RPD = \frac{(C1 - C2) \times 100\%}{(C1 + C2) / 2}$$

where: RPD = relative percent difference
C1 = larger of the two observed values
C2 = smaller of the two values

Accuracy will be calculated as percent recovery involving matrix spike measurements (%R).

$$\%R = 100\% \times (s - u / Csa)$$

where: %R = percent recovery
S = measured concentration in spiked aliquot
U = measured concentration in unspiked aliquot
Csa = actual concentration of spike added

Completeness will be defined as percent completeness.

$$\%C = 100\% \times (V / N)$$

where: %C = percent completeness
V = number of measurements judged valid
N = total number of measurements necessary to achieve a specified level of confidence in decision making

Tables and Figures

Quality Assurance Project Plan Approval Form
For
Former Rainier Brewery Property

Project ID No.: 031506 **Work Plan No.:** 2

Client: Ariel Development **Client Contact:** Eitan Alon

QA Project Plan Title: QA/QC Plan, Former Rainier Brewery Property

Commitment to Implement the Above QA Project Plan:

Project Task Manager	**Signature**	**Date**
QA/QC Manager	**Signature**	**Date**
Other as Appropriate Affiliation*	**Signature**	**Date**
Other as Appropriate Affiliation*	**Signature**	**Date**
Other as Appropriate Affiliation*	**Signature**	**Date**

***Commitment signature is required for any ancillary sampling, analytical, or data gathering support provided by a subcontractor or principal investigator.**

Approval to Proceed in Accordance to the above project plan:

Technical Project Manager	**Signature**	**Date**

Concurrences:

QA Project Manager	**Signature**	**Date**
Regulator Project Manager (If Applicable)	**Signature**	**Date**

Figure 1

Project Organizational Chart

Former Rainier Brewery property

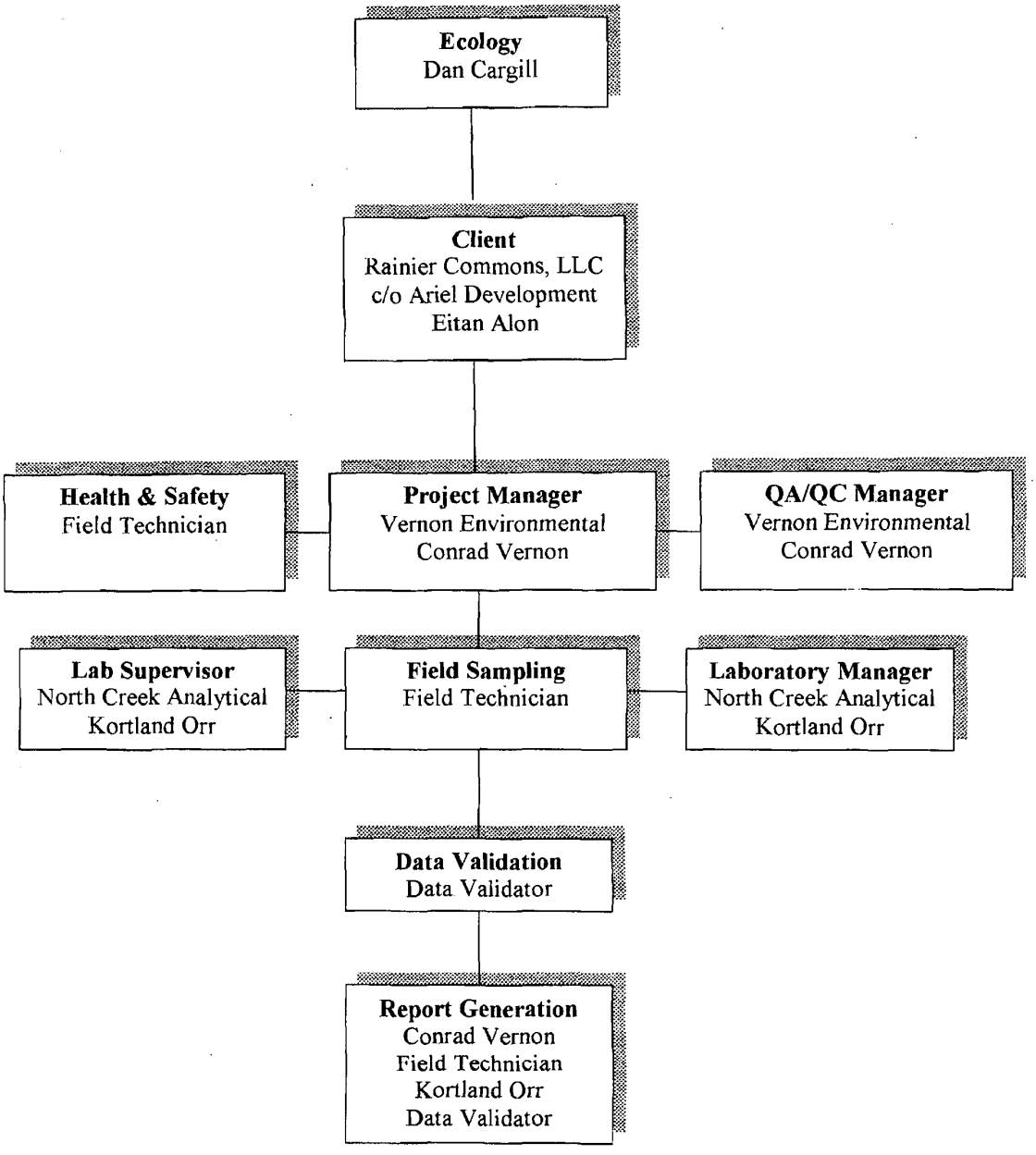


Figure 2

Data Flow Schematic (Data Reduction, Validation, Reporting)

Former Rainier Brewery Property

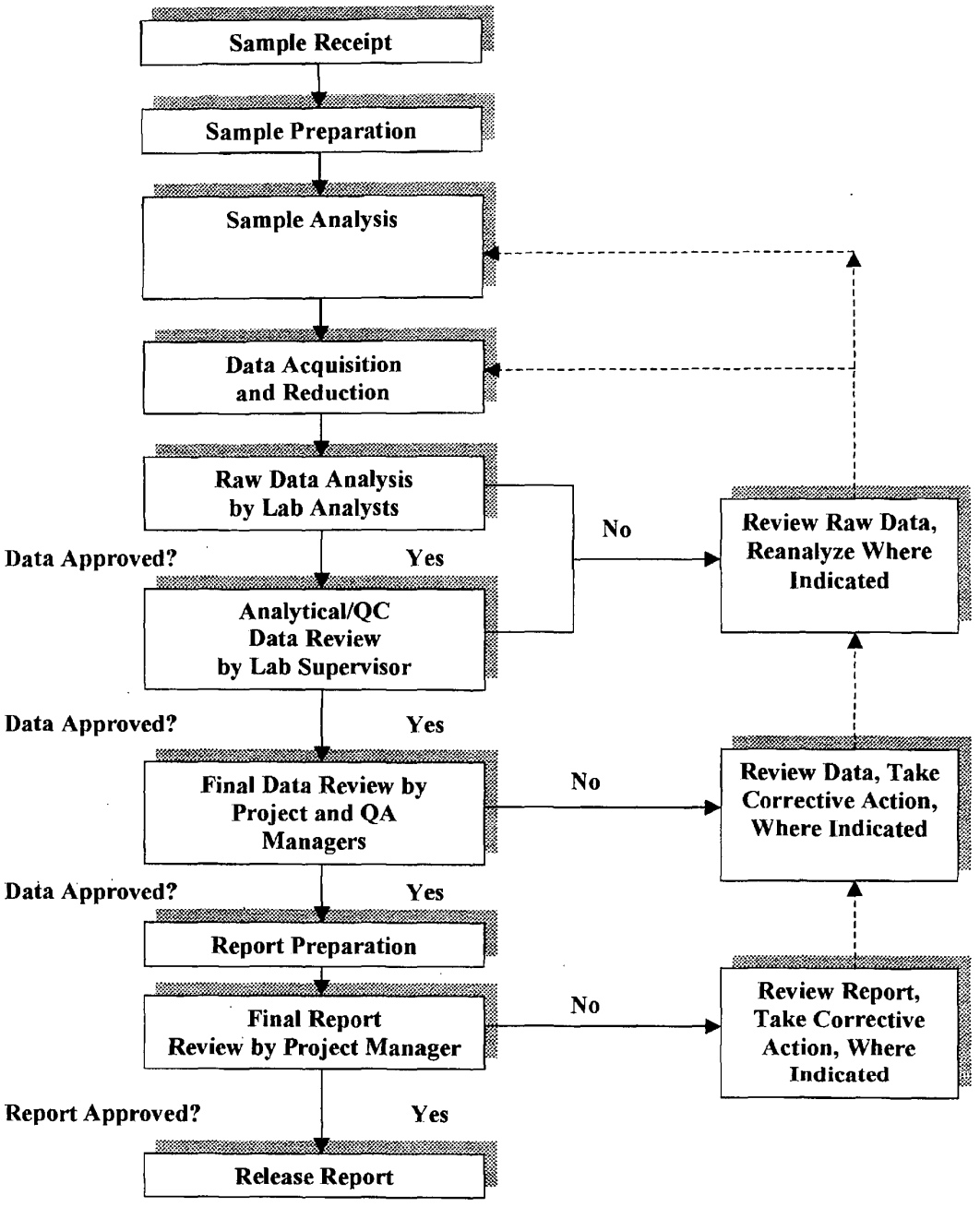


TABLE 1

QUANITATIVE OBJECTIVES

Analytical Method Details

Method	Analyte	MDL	MRL	Units	Surr. %R	DUP RPD	Matrix Spike %R	Matrix Spike RPD	Blank Spike %R	Blank Spike RPD	CAS #
Polychlorinated Biphenyls by EPA Method 8082 in Soil											
EPA 8082	Aroclor 1016	2.66	25.0	ug/kg dry wt	-	-	47-134	35	54-125	30	12674-11-2
EPA 8082	Aroclor 1016 [2C]	2.66	25.0	ug/kg dry wt	-	-	47-134	35	54-125	30	12674-11-2
EPA 8082	Aroclor 1221	13.3	50.0	ug/kg dry wt	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1221 [2C]	13.3	50.0	ug/kg dry wt	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1232	5.76	25.0	ug/kg dry wt	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1232 [2C]	5.76	25.0	ug/kg dry wt	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1242	2.08	25.0	ug/kg dry wt	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1242 [2C]	2.08	25.0	ug/kg dry wt	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1248	1.78	25.0	ug/kg dry wt	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1248 [2C]	1.78	25.0	ug/kg dry wt	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1254	1.49	25.0	ug/kg dry wt	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1254 [2C]	1.49	25.0	ug/kg dry wt	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1260	3.80	25.0	ug/kg dry wt	-	-	22-171	35	58-128	30	11096-82-5
EPA 8082	Aroclor 1260 [2C]	3.80	25.0	ug/kg dry wt	-	-	22-171	35	58-128	30	11096-82-5
EPA 8082	Aroclor 1262	1.46	25.0	ug/kg dry wt	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1262 [2C]	1.46	25.0	ug/kg dry wt	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1268	6.20	25.0	ug/kg dry wt	-	-	-	-	-	-	11100-14-4
EPA 8082	Aroclor 1268 [2C]	6.20	25.0	ug/kg dry wt	-	-	-	-	-	-	11100-14-4
EPA 8082	TCX			Surrogate	39-139	-	-	-	-	-	877-09-8
EPA 8082	TCX [2C]			Surrogate	39-139	-	-	-	-	-	877-09-8
EPA 8082	Decachlorobiphenyl			Surrogate	33-163	-	-	-	-	-	2051-24-3
EPA 8082	Decachlorobiphenyl [2C]			Surrogate	33-163	-	-	-	-	-	2051-24-3
Polychlorinated Biphenyls by EPA Method 8082 in Wipe											
EPA 8082	Aroclor 1016	0.500	2.00	ug/Wipe	-	-	70-130	25	70-130	25	12674-11-2
EPA 8082	Aroclor 1016 [2C]	0.500	2.00	ug/Wipe	-	-	70-130	25	70-130	25	12674-11-2
EPA 8082	Aroclor 1221	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1221 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11104-28-2
EPA 8082	Aroclor 1232	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1232 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11141-16-5
EPA 8082	Aroclor 1242	0.500	2.00	ug/Wipe	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1242 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	53469-21-9
EPA 8082	Aroclor 1248	0.500	2.00	ug/Wipe	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1248 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	12672-29-6
EPA 8082	Aroclor 1254	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1254 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11097-69-1
EPA 8082	Aroclor 1260	0.500	2.00	ug/Wipe	-	-	52-140	25	52-140	25	11096-82-5
EPA 8082	Aroclor 1260 [2C]	0.500	2.00	ug/Wipe	-	-	52-140	25	52-140	25	11096-82-5
EPA 8082	Aroclor 1262	0.500	2.00	ug/Wipe	-	-	-	-	-	-	37324-23-5

EPA 8082	Aroclor 1262 [2C]	0.500	2.00	ug/Wipe	-	-	-	-	-	-	37324-23-5
EPA 8082	Aroclor 1268	0.500	2.00	ug/Wipe	-	-	-	-	-	-	11100-14-4
EPA 8082	Aroclor 1268 [2C]			ug/Wipe	-	-	-	-	-	-	11100-14-4
EPA 8082	TCX			Surrogate	40-130	-	-	-	-	-	877-09-8
EPA 8082	TCX [2C]			Surrogate	40-130	-	-	-	-	-	877-09-8
EPA 8082	Decachlorobiphenyl			Surrogate	40-130	-	-	-	-	-	2051-24-3
EPA 8082	Decachlorobiphenyl [2C]			Surrogate	40-130	-	-	-	-	-	2051-24-3